HP 3PAR Storage Replication Adapter 5.0 for VMware vCenter Site Recovery Manager Troubleshooting Guide

Abstract

This document provides troubleshooting and workflow information for the HP 3PAR Storage Replication Adapter for VMware vCenter Site Recovery Manager.

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GetRCTargetSysInfo....94
GetRecoveryInformationById....95
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GetTaskStatus....97
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1 Introduction

About the HP 3PAR Storage Replication Adapter

The HP 3PAR VMware vCenter Storage Replication Adapter (SRA) interacts with array management systems to discover arrays and replicated LUNs. These interactions are provided by various scripts installed with VMware vCenter Site Recovery Manager (SRM). HP 3PAR SRA creates software modules with predefined interfaces, which provide SRM with replication information, and executes needed commands using XML. HP 3PAR SRA provides an interfaces set, which is defined between SRM and replicated storage arrays that enables SRM to execute the following workflows:

- Discovery of replicated storage
- Non-disruptive failover test using a writable copy of replicated data
- Emergency, or planned, failover
- Reverse replication after failover as part of failback
- Restore replication after failover as part of a production test

System requirements

- Microsoft Visual C++ 2008 Redistributable Package (x86) is required prior to the installation.
- Microsoft .Net Framework V3.5 is required prior to the installation.
- All LUNs used by VMware Virtual Machines to form a protection group that are failed over together during test and recovery have to be part of a single HP 3PAR Remote Copy group. Refer to the *HP 3PAR Remote Copy Software User's Guide* for Remote Copy group setup and configuration.
- HP 3PAR Remote Copy Software license on an HP 3PAR Storage System.
- HP 3PAR Virtual Copy Software license on an HP 3PAR Storage System

Turning on logging

The HP 3PAR Storage Replication Adapter (SRA) uses the same log scheme as the VMware vCenter Site Recovery Manager for (SRM). The log file path is specified by SRM as one of the XML elements in the input XML content.

2 Workflows and Corresponding Log Messages

HP 3PAR Storage Replication Adpater (SRA) supports the following 20 commands, which are discussed in the proceeding sections:

- queryInfo
- queryStrings
- queryErrorDefinitions
- queryCapabilities
- queryConnectionParameters
- discoverArrays
- discoverDevices
- checkTestFailoverStart
- testFailoverStart
- testFailoverStop
- checkFailover
- perpareFailover
- failover
- perpareReverseReplication
- reverseReplication
- perpareRestoreReplication
- restoreReplication
- syncOnce
- querySyncStatus
- queryReplicationSettings

queryInfo

The queryInfo command returns information describing the HP 3PAR SRA in XML format.

The following information is requested by SRM:

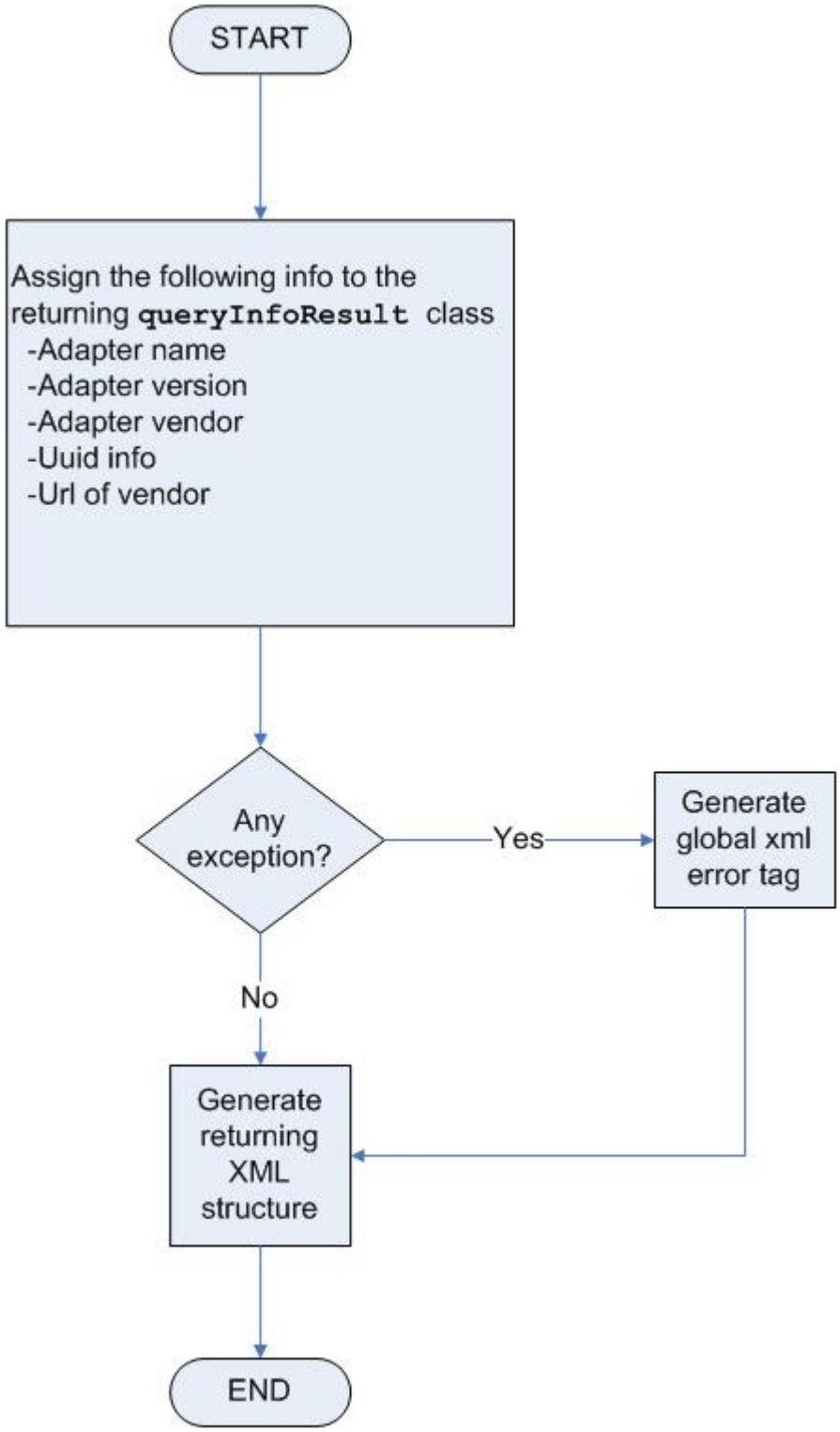
- Adapter name
- Adapter version
- Adapter vendor
- Uuid information (RFC 4122 format)
- URL for online documentation for the HP 3PAR SRA (http://www.hp.com/go/storage/vmware)

Troubleshooting checklist

Table 1 queryInfo Troubleshooting Checklist

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check log file path.	Missing log file path information in the input XML.	[2010-05-26 14:29:32.966 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2014 warning (id=1052)] Warning. Unable to access the specified log folder. The log file will be available at the following location: <C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\3PARInServ>	This error means that the input XML file does not contain log file path and the logs generated with this command will be saved to the folder indicated.

Workflow chart



queryString

The queryString command returns translation of the strings for a given locale in XML format.

The following information is requested by SRM:

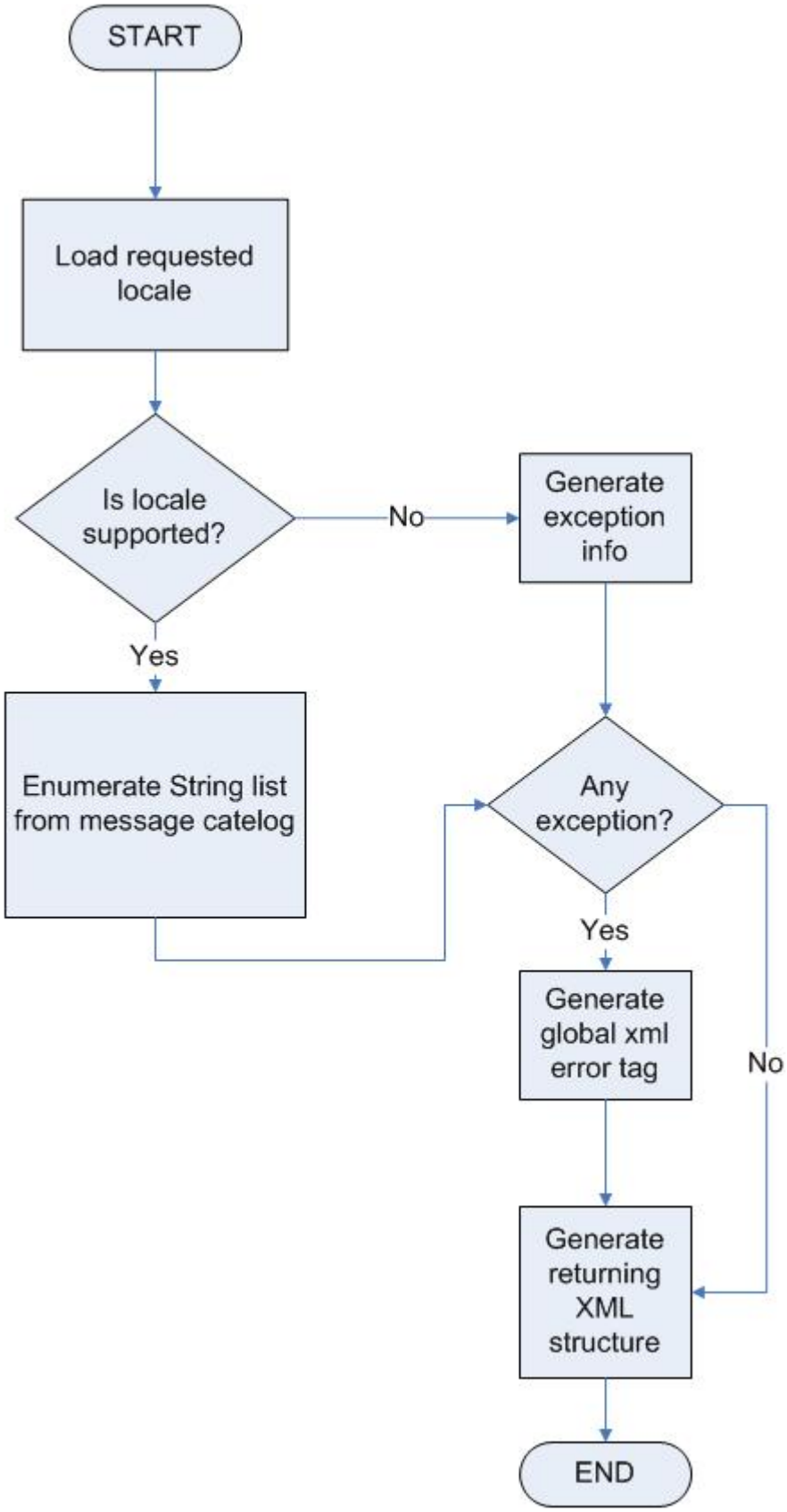
- UTF-8 encoded string localized to the specified locale
- Translation of the string identified by the specified ID
- Command progress update

Troubleshooting checklist

Table 2 queryString Troubleshooting Checklist

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check log file path.	Missing log file path information in the input XML.	[2010-05-26 14:29:32.966 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2014 warning (id=1052)] Warning. Unable to access the specified log folder. The log file will be available at the following location: <C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\3PARInServ>	This error means that the input XML file does not contain the log file path and the logs generated with this command will be saved to the folder indicated.
Load requested locale	Missing requested locale	[2010-05-26 17:41:31.640 'TPDSrm.queryStrings.Run' 3PAR_0101 error (id=3672)] Locale <ja> is not supported.	This error means that the requested locale is not supported by HP 3PAR SRA. Currently only “en” is supported.

Workflow chart



queryErrorDefinitions

The queryErrorDefinitions command returns pre-defined array-specific error and warning descriptions in XML format.

The following information is requested by SRM:

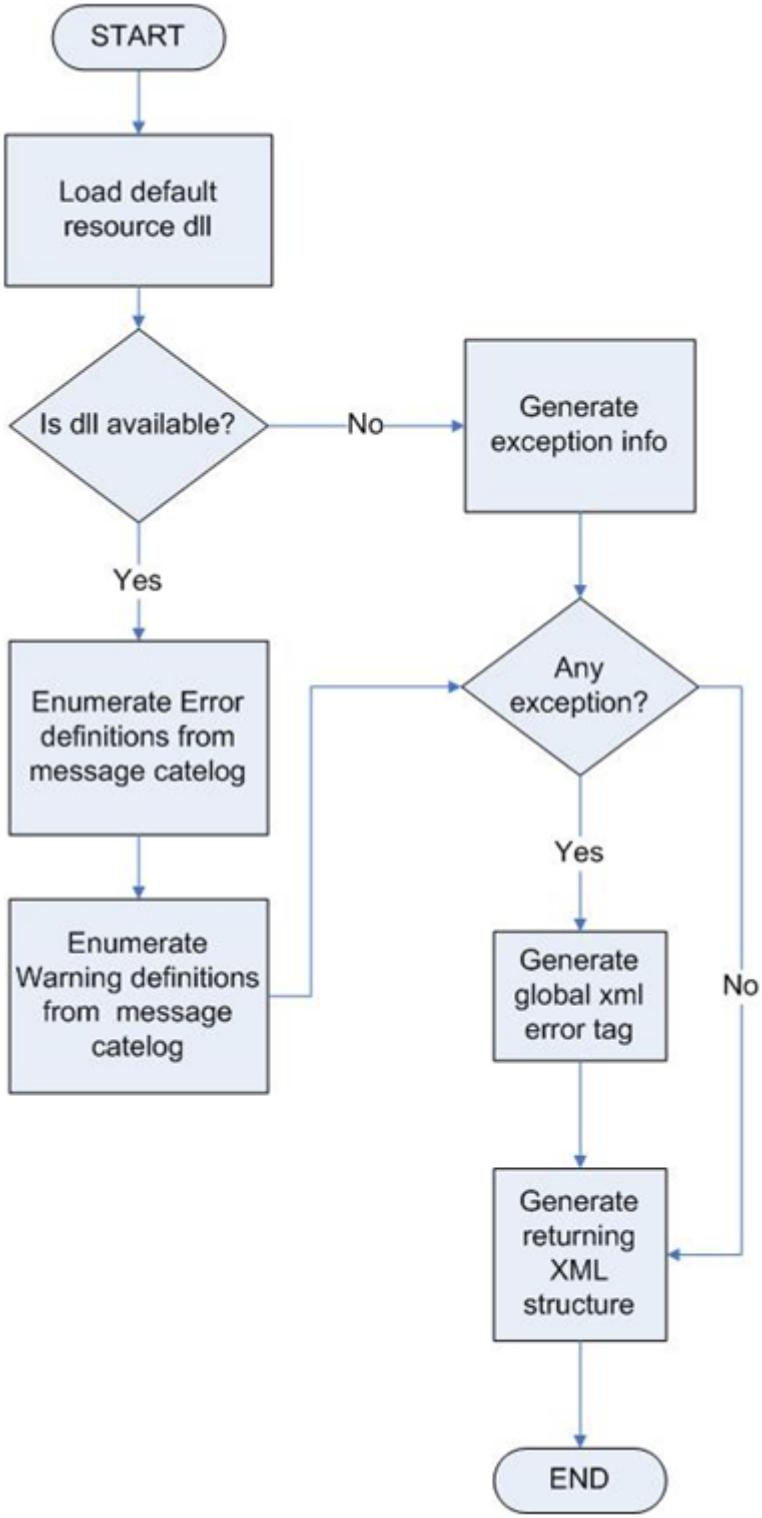
- Error and warning definition should contain code, description, and fix hint for each set
- Command progress update

Troubleshooting checklist

Table 3 queryErrorDefinitions Troubleshooting Checklist

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check log file path.	Missing log file path information in the input XML.	[2010-05-26 14:29:32.966 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2014 warning (id=1052)] Warning. Unable to access the specified log folder. The log file will be available at the following location: <C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\3PARInServ>.	This error means that the input XML file does not contain log file path and the logs generated with this command will be saved to the folder indicated.
Load default resource dll.	Missing the resource file.	[2010-05-26 18:00:07.531 'SetLogFolder' 3PAR_1001 info (id=6132)] Could not find any resources appropriate for the specified culture or the neutral culture. Make sure "TPDSrm.MessageString.resources" was correctly embedded or linked into assembly "TPDSrm" at compile time, or that all the satellite assemblies required are loadable and fully signed.	This error means that the default `TPDSrm.resources.dll` file is missing from installation. Reinstall the package to repair the file.

Workflow Chart



queryCapabilities

The queryCapabilities command returns supported versions of the array replication software, supported array models, and supported SRM commands.

The following information is requested by SRM:

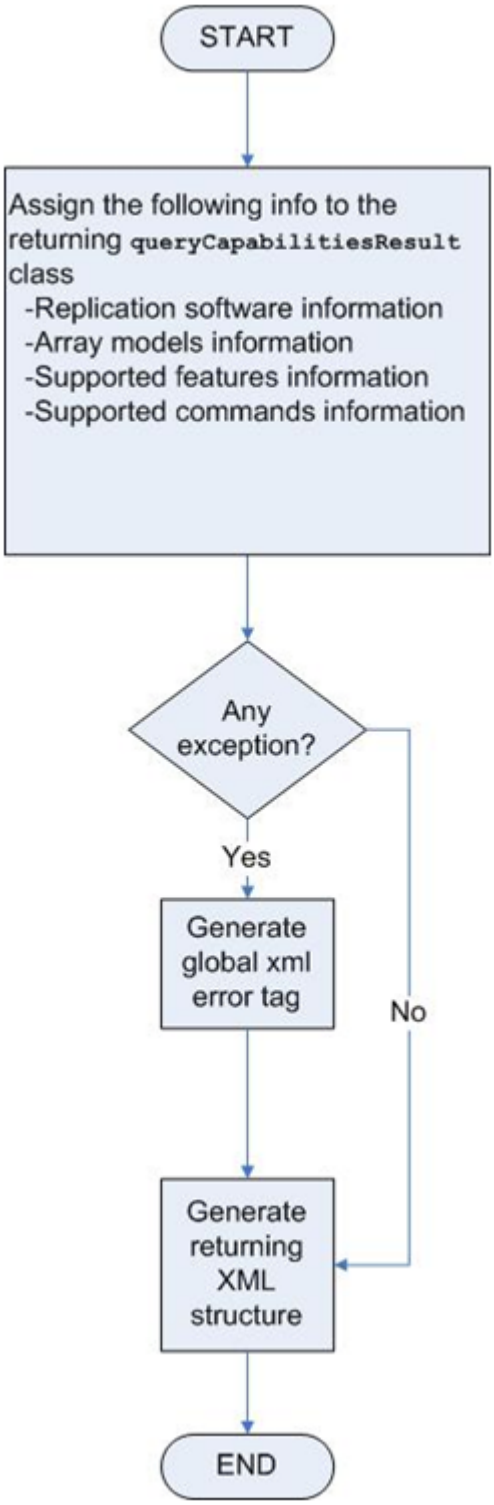
- Information of supported versions of the array replication software (for display purposes)
- Information of supported array models (for display purposes)
- The list of supported SRM commands that is used by SRA to determine the set of SRM workflows that SRA supports
- The list of supported SRM features that are used by SRA. Currently HP 3PAR SRA supports ConsistencyGroups, DeviceIdentification (WWN), DynamicAccessRestriction, FC and ISCSI protocols, and Localization

Troubleshooting checklist

Table 4 queryCapabilities Troubleshooting Checklist

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check log file path.	Missing log file path information in the input XML.	[2010-05-26 14:29:32.966 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2014 warning (id=1052)] Warning. Unable to access the specified log folder. The log file will be available at the following location: <C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\3PARInServ>.	This error means that the input XML file does not contain log file path and the logs generated with this command will be saved to the folder indicated.
Load default resource dll.	Missing the resource file.	[2010-05-26 18:00:07.531 'SetLogFolder' 3PAR_1001 info (id=6132)] Could not find any resources appropriate for the specified culture or the neutral culture. Make sure "TPDSrm.MessageString.resources" was correctly embedded or linked into assembly "TPDSrm" at compile time, or that all the satellite assemblies required are loadable and fully signed.	This error means that the default `TPDSrm.resources.dll` file is missing from installation. Reinstall the package to repair the file.

Workflow chart



queryConnectionParameters

The queryConnectionParameters command returns a list of parameters required to establish connection with the array management system.

The following information is requested by SRM:

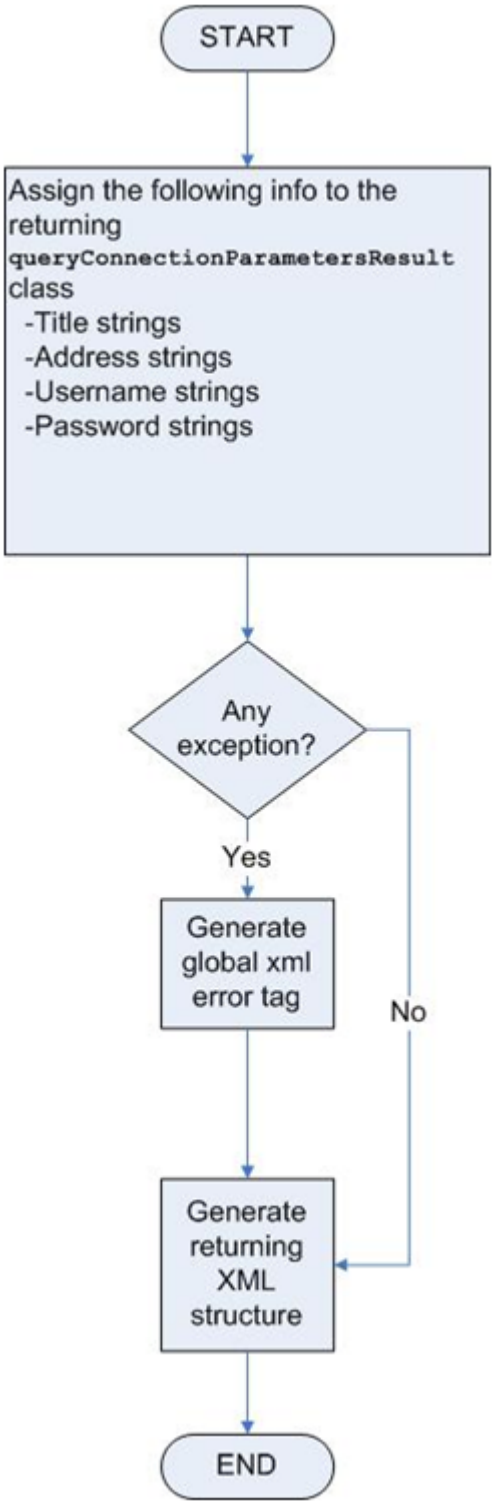
- Group of parameters required to establish a connection to the HP 3PAR Storage System
- Localized string representing title, address information, username, password, etc. to be displayed to the user GUI

Troubleshooting checklist

Table 5 queryConnectionParameters Troubleshooting Checklist

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check log file path.	Missing log file path information in the input XML.	[2010-05-26 14:29:32.966 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2014 warning (id=1052)] Warning. Unable to access the specified log folder. The log file will be available at the following location: <C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\3PARInServ>.	This error means that the input XML file does not contain log file path and the logs generated with this command will be saved to the folder indicated.
Load default resource dll.	Missing the resource file.	[2010-05-26 18:00:07.531 'SetLogFolder' 3PAR_1001 info (id=6132)] Could not find any resources appropriate for the specified culture or the neutral culture. Make sure "TPDSrm.MessageString.resources" was correctly embedded or linked into assembly "TPDSrm" at compile time, or that all the satellite assemblies required are loadable and fully signed.	This error means that the default `TPDSrm.resources.dll` file is missing from installation. Reinstall the package to repair the file.

Worflow chart



discoverArrays

The discoverArrays command returns the following information about storage arrays configuration for replication:

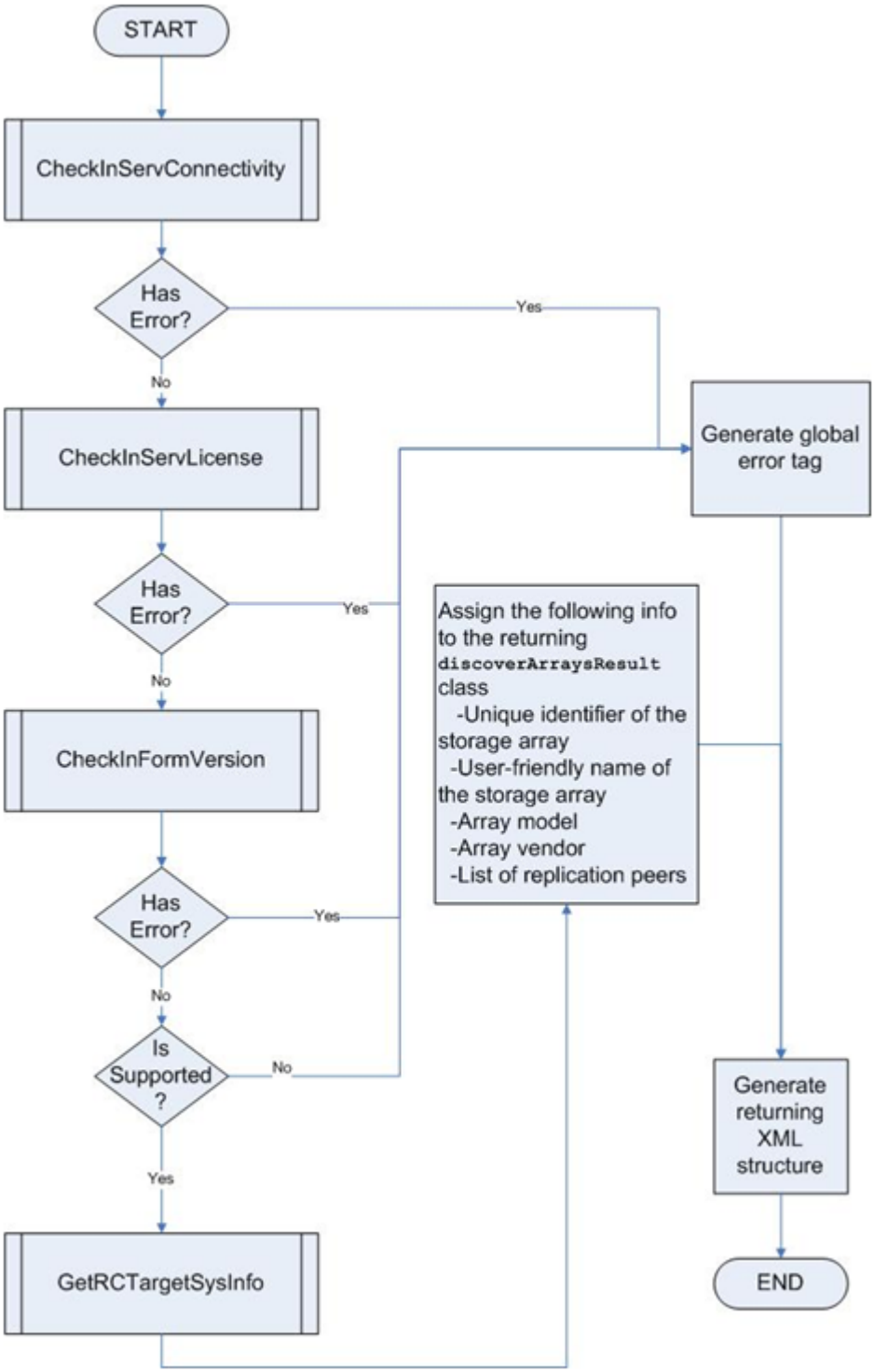
- Unique identifier for the storage array
- User-friendly name of the storage array
- Array model
- Array vendor
- List of replication peers

Troubleshooting checklist

Table 6 discoverArrays Troubleshooting Checklist

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check log file path.	Missing log file path information in the input XML.	[2010-05-26 14:29:32.966 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2014 warning (id=1052)] Warning. Unable to access the specified log folder. The log file will be available at the following location: <C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\3PARInServ>.	This error means that the input XML file does not contain log file path and the logs generated with this command will be saved to the folder indicated.
Load default resource dll.	Missing the resource file.	[2010-05-26 18:00:07.531 'SetLogFolder' 3PAR_1001 info (id=6132)] Could not find any resources appropriate for the specified culture or the neutral culture. Make sure "TPDSrm.MessageString.resources" was correctly embedded or linked into assembly "TPDSrm" at compile time, or that all the satellite assemblies required are loadable and fully signed.	This error means that the default `TPDSrm.resources.dll` file is missing from installation. Reinstall the package to repair the file.
Check HP 3PAR Storage System connectivity.	Connection error	[2010-05-27 10:33:40.062 'arrayMgm.CheckInServConnectivity' 3PAR_1007 error (id=4056)] Error. Unable to get system information. Additional information: login failed - Invalid user or password.	This error indicates that the user name or password is invalid.
Check HP 3PAR Storage System license.	Missing required license on system.	[2010-05-27 11:36:25.156 'TPDSrm.arrayMgm.CheckInServLicense' 3PAR_1014 error (id=4180)] Error. Missing required <Virtual Copy> license on the connected HP 3PAR Storage System.	This error indicates that required license is missing. HP 3PAR SRA requires the HP 3PAR Storage System to have both Remote Copy Software and Virtual Copy Software licenses.
Check HP 3PAR Storage System version.	Unsupported storage array.	[2010-05-27 12:04:14.812 'TPDSrm.discoverArrays.Run' 3PAR_1055 error (id=816)] Error. This version of SRA does not support 3PAR Storage Server that has <2.2.4> InFormOS.	This error indicates that the requested array system has unsupported OS version number.
	Missing expected output content from storage.	[2010-05-27 10:58:47.031 'TPDSrm.discoverArrays.Run' 3PAR_1029 error (id=5432)] Error. Unable to verify InServ version number.	This error indicates that storage array returns empty output for the command issued. This might be caused by intermittent network interrupt.

Workflow chart



discoverDevices

The discoverDevices command returns devices on the specified storage array configured for replication with the specified target array.

SRM recognizes the following device types:

- replication source – A read-write device on the source array configured for replication to the target array
- replication target – A read-only replica on the target array identified by a string key
- demoted source – The replication source put in read-only mode in preparation for failover
- promoted target – The read-write device on the target array created from replication target during failover

The following information is expected for each replication source:

- A unique device ID, used by SRM to execute commands like queryDeviceDetails and syncOnce
- An optional user-friendly name of the device
- An identification used by SRM to match the replicated device to a device attached to an ESX host
- A unique key identifying the replication target used by SRM to execute commands like testFailoverStart, testFailoverStop, and failover

The following information is expected for each replication target:

- A unique key identifying the target
- An optional user-friendly name of the target

The following information is expected for each demoted source:

- A unique device ID
- An optional user-friendly name of the device
- A unique key identifying the replication target

The demoted source does not contain device identification because the device is not expected to be visible to any ESX host.

The replication target is identified by a key, which can be different from the ID of the promoted device after failover. The promoted device should contain both key and ID of the promoted device. Once replication is reversed, the promoted target becomes a replication source, which is identified by device ID only.

The following information is expected for each promoted target:

- A unique key identifying the target
- An optional user-friendly name of the target
- A unique device ID of the device created during failover
- An identification used by SRM to match the promoted device to a device attached to an ESX host

HP 3PAR supports World-Wide Name (WWN) device identification for Fibre Channel and iSCSI devices.

Troubleshooting checklist

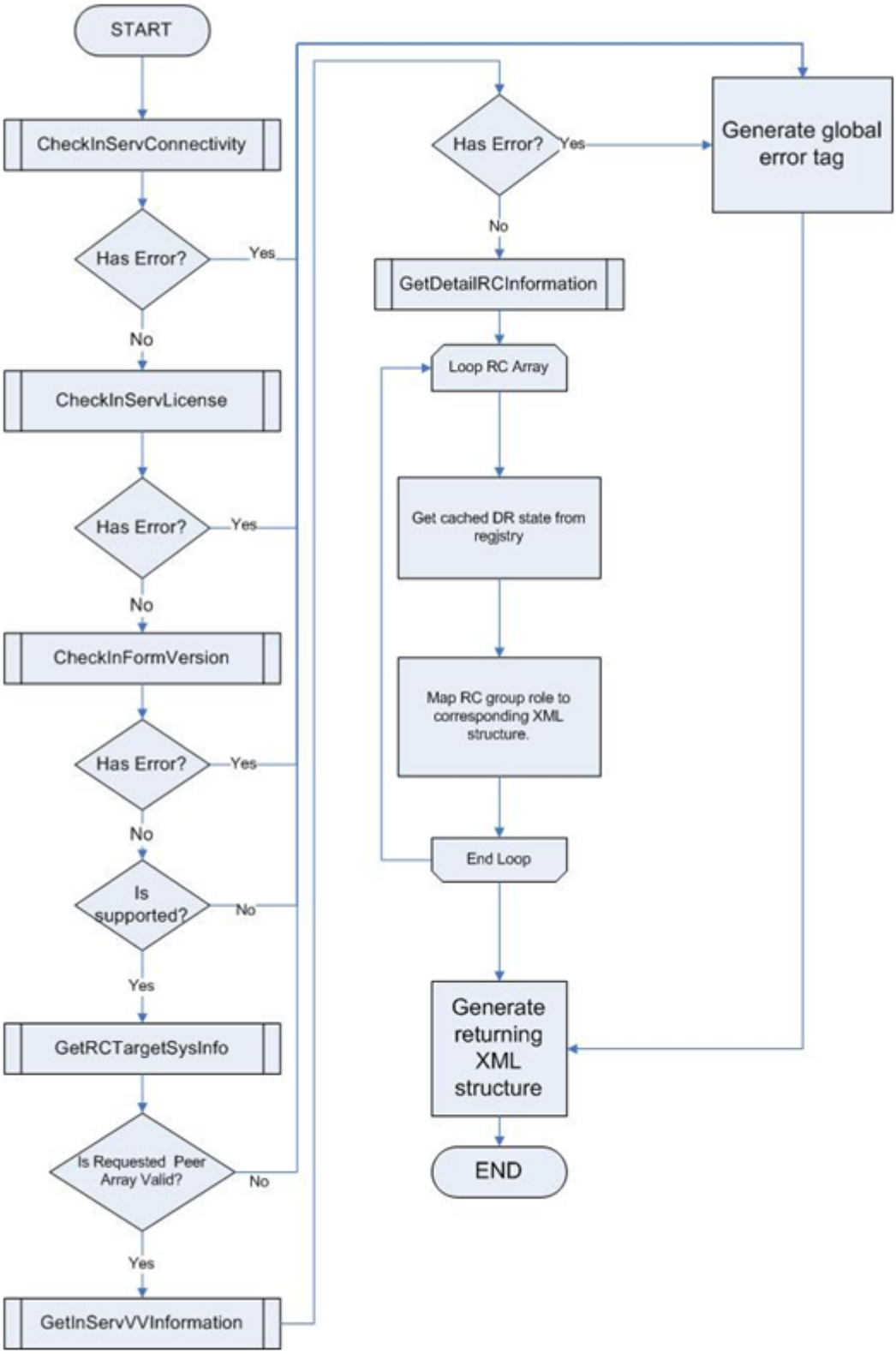
Table 7 discoverDevices Troubleshooting Checklist

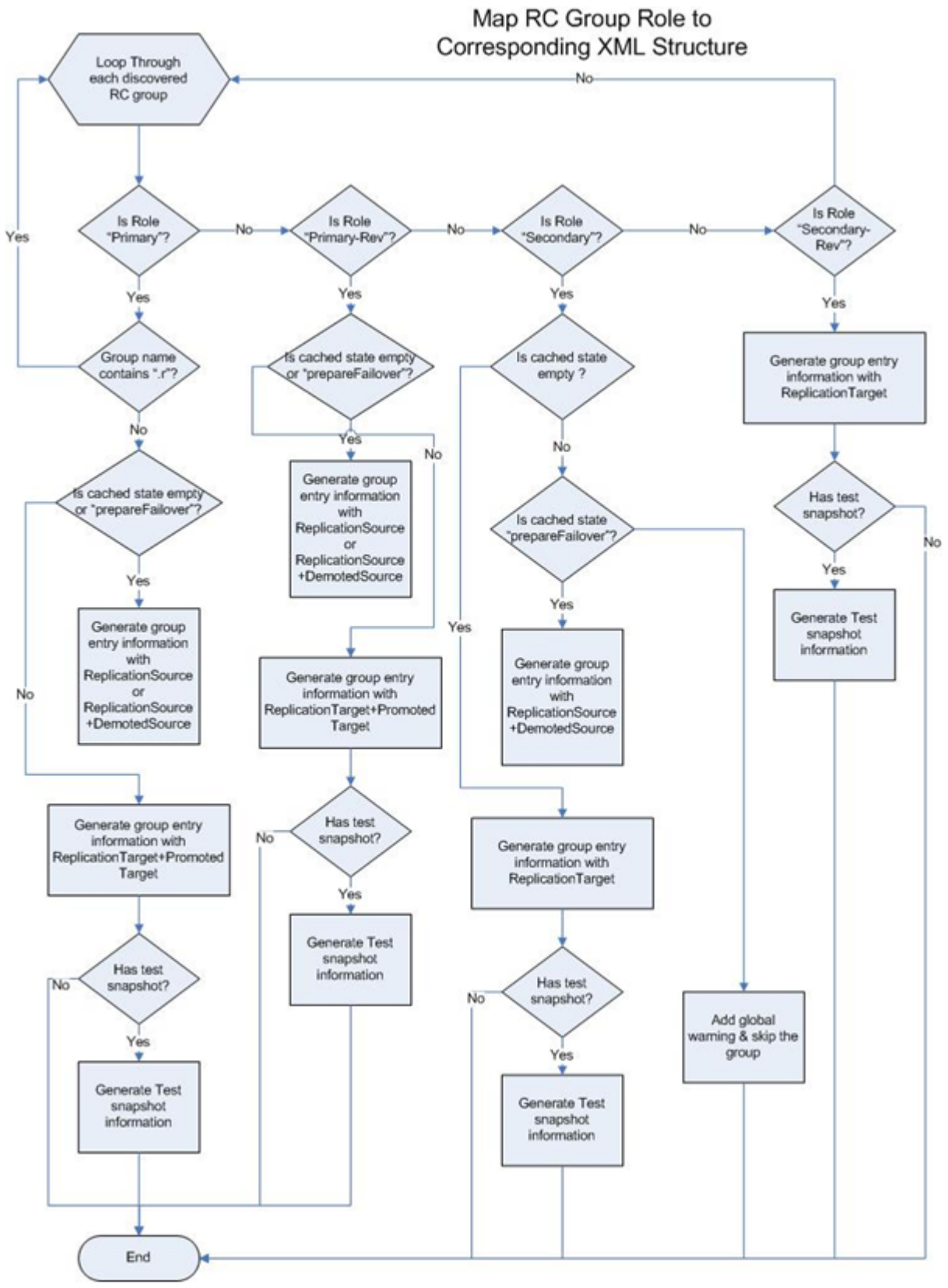
Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check log file path.	Missing log file path information in the input XML.	[2010-05-26 14:29:32.966 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2014 warning (id=1052)] Warning. Unable to access the specified log folder. The log file will be available at the following location: <C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\3PARInServ>.	This error means that the input XML file does not contain log file path and the logs generated with this command will be saved to the folder indicated.
Load default resource dll.	Missing the resource file.	[2010-05-26 18:00:07.531 'SetLogFolder' 3PAR_1001 info (id=6132)] Could not find any resources appropriate for the specified culture or the neutral culture. Make sure "TPDSrm.MessageString.resources" was correctly embedded or linked into assembly "TPDSrm" at compile time, or that all the satellite assemblies required are loadable and fully signed.	This error means that the default `TPDSrm.resources.dll` file is missing from installation. Reinstall the package to repair the file.
Check HP 3PAR Storage System connectivity.	Connection error	[2010-05-27 10:33:40.062 'arrayMgm.CheckInServConnectivity' 3PAR_1007 error (id=4056)] Error. Unable to get system information. Additional information: login failed - Invalid user or password.	This error indicates that the user name or password is invalid.
Check HP 3PAR Storage System ID.	The requested array ID does not match connected storage array.	[2010-05-27 16:59:32.796 'TPDSrm.discoverDevices.Run' 3PAR_1012 error (id=4616)] Error. Array id <347> does not match the connected HP 3PAR Storage System.	This error indicates that the connected storage array has a different system id than the requested input.
Check HP 3PAR Storage System license.	Missing required license on system.	[2010-05-27 11:36:25.156 'TPDSrm.arrayMgm.CheckInServLicense' 3PAR_1014 error (id=4180)] Error. Missing required <Virtual Copy> license on the connected HP 3PAR Storage System.	This error indicates that required license is missing. HP 3PAR SRA requires the HP 3PAR Storage System to have both Remote Copy Software and Virtual Copy Software licenses.
Check HP 3PAR Storage System version.	Unsupported storage array.	[2010-05-27 12:04:14.812 'TPDSrm.discoverArrays.Run' 3PAR_1055 error (id=816)] Error. This version of SRA does not support 3PAR Storage Server that has <2.2.4> InFormOS.	This error indicates that the requested array system has unsupported OS version number.
	Missing expected output content from storage.	[2010-05-27 10:58:47.031 'TPDSrm.discoverArrays.Run' 3PAR_1029 error (id=5432)] Error. Unable to verify InServ version number.	This error indicates that storage array returns empty output for the command issued. This might be caused by intermittent network interrupt.
Get Remote Copy target system information.	Unable to validate the requested peer array id as one of the target system for Remote Copy.	[2010-05-27 14:14:40.031 'TPDSrm.discoverDevices.Run' 3PAR_1013 error (id=1408)] Error. Peer array id <4145> is not a valid entry in the connected HP 3PAR Storage System.	This error indicates that the requested peer array is not a valid target system for HP 3PAR Remote Copy Software setup. Check Remote Copy configuration on the storage array for more information.

Table 7 discoverDevices Troubleshooting Checklist *(continued)*

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Get Virtual Volume information on the HP 3PAR Storage System.	Missing expected output content from storage.	[2010-05-27 10:58:47.031 'TPDSrm.discoverDevices.Run' 3PAR_1018 error (id=5432)] Error. Unable to get detail virtual volume information. Additional information: <xxxx>.	This error indicates that storage array returns empty output for the command issued. This can be caused by intermittent network interruption.
Map Remote Copy group role.	Unsupported Remote Copy group naming convention.	[2010-05-27 14:20:27.406 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2017 warning (id=248)] Warning. Group name <mscsrc01_arb.r419> has unsupported naming convention.	This warning indicates that the specified Remote Copy group has unsupported naming convention and will be skipped from discovery process. Remote Copy group that has "Primary" role with <xxxx> naming convention is not supported by HP 3PAR SRA.
	Invalid group state.	[2010-05-27 15:28:45.046 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2019 warning (id=3972)] Remote Copy group <mscs_rc_sql_db1.r419> is in invalid SRA state.	The Remote Copy group can get into an invalid SRA state when a user reinstalls or reconfigures the SRM setting after failover. Refer to Implementation Guide for how to reset the SRA state to this group.

Workflow chart




Map RC Group Role to Corresponding XML Structure
Loop Through each discovered RC group
No
Is Role "Primary"?
No
Is Role "Primary-Rev"?
No
Is Role "Secondary"?
No
Is Role "Secondary-Rev"?
Yes
Yes
Yes
Yes
Yes
Group name contains ".r"?
Is cached state empty or "prepareFailover"?
Is cached state empty ?
Generate group entry information with ReplicationTarget
No
Yes
No
No
Is cached state empty or "prepareFailover"?
Generate group entry information with ReplicationSource or ReplicationSource +DemotedSource
Is cached state "prepareFailover"?
Has test snapshot?
No
Yes
Yes
Yes
Generate group entry information with ReplicationSource or ReplicationSource +DemotedSource
Generate group entry information with ReplicationTarget+Promoted Target
Generate group entry information with ReplicationSource +DemotedSource
Generate Test snapshot information
No
Yes
No
Generate group entry information with ReplicationTarget+Promoted Target
Has test snapshot?
Generate group entry information with ReplicationTarget
No
Yes
Generate Test snapshot information
Has test snapshot?
Add global warning & skip the group
No
Yes
Yes
Generate Test snapshot information
Generate Test snapshot information
End

checkTestFailoverStart

The checkTestFailoverStart command validates environment and target devices before test failover. This command is expected to perform various configuration and runtime state checks on the specified target devices and identify problems which will prevent successful test.

SRM expects the HP 3PAR SRA to perform the following checks:

- Initial data synchronization has completed and there is a copy of the production data ready for test.
- There is a valid license to perform test operation.

The returning structure should return the status of the group indicating whether it is ready for test failover operation.

Troubleshooting checklist

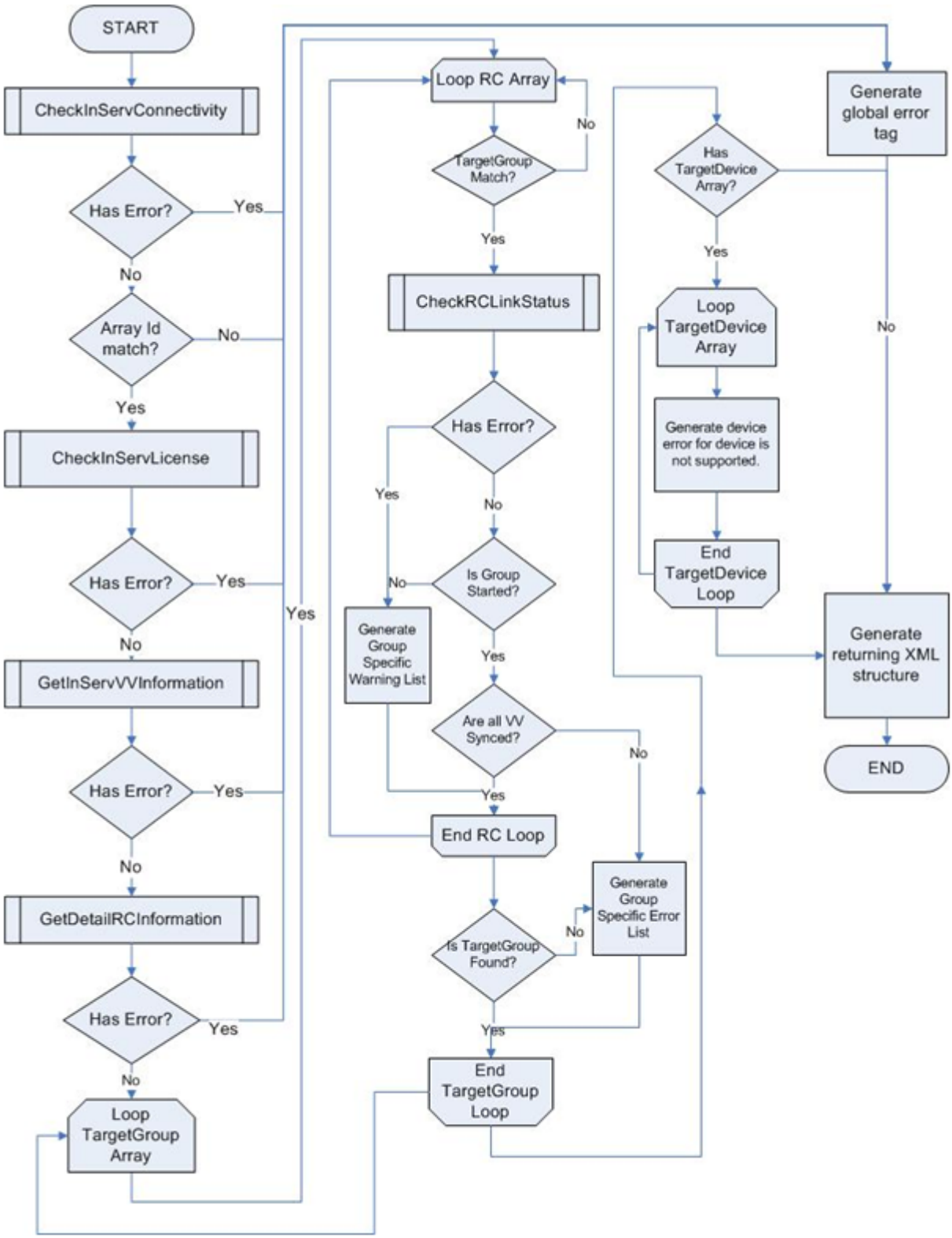
Table 8 checkTestFailoverStart Troubleshooting Checklist

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check log file path.	Missing log file path information in the input XML.	[2010-05-26 14:29:32.966 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2014 warning (id=1052)] Warning. Unable to access the specified log folder. The log file will be available at the following location: <C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\3PARInServ>.	This error means that the input XML file does not contain log file path and the logs generated with this command will be saved to the folder indicated.
Load default resource dll.	Missing the resource file.	[2010-05-26 18:00:07.531 'SetLogFolder' 3PAR_1001 info (id=6132)] Could not find any resources appropriate for the specified culture or the neutral culture. Make sure "TPDSrm.MessageString.resources" was correctly embedded or linked into assembly "TPDSrm" at compile time, or that all the satellite assemblies required are loadable and fully signed.	This error means that the default `TPDSrm.resources.dll` file is missing from installation. Reinstall the package to repair the file.
Check HP 3PAR Storage System connectivity.	Connection error	[2010-05-27 10:33:40.062 'arrayMgm.CheckInServConnectivity' 3PAR_1007 error (id=4056)] Error. Unable to get system information. Additional information: login failed - Invalid user or password.	This error indicates that the user name or password is invalid.
Check HP 3PAR Storage System ID.	The requested array ID does not match connected storage array.	[2010-05-27 16:59:32.796 'TPDSrm.discoverDevices.Run' 3PAR_1012 error (id=4616)] Error. Array id <347> does not match the connected HP 3PAR Storage System.	This error indicates that the connected storage array has a different system id than the requested input.
Check HP 3PAR Storage System license.	Missing required license on system.	[2010-05-27 11:36:25.156 'TPDSrm.arrayMgm.CheckInServLicense' 3PAR_1014 error (id=4180)] Error. Missing required <Virtual Copy> license on the connected HP 3PAR Storage System.	This error indicates that required license is missing. HP 3PAR SRA requires the HP 3PAR Storage System to have both Remote Copy Software and Virtual Copy Software licenses.
Get Virtual Volume information on the HP 3PAR Storage System	Missing expected output content from storage.	[2010-05-27 10:58:47.031 'TPDSrm. checkTestFailoverStart.Run' 3PAR_1018 error (id=5432)] Error. Unable to get detail virtual volume information. Additional information: <xxxx>	This error indicates that storage array returns empty output for the command issued. This can be caused by intermittent network interruption.

Table 8 checkTestFailoverStart Troubleshooting Checklist *(continued)*

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check Remote Copy group status	Invalid Remote Copy group.	[2010-05-27 16:33:37.734 'TPDSrm.checkTestFailoverStart.Run' 3PAR_1022 error (id=1580)] Error. The specified group <MmmtGroup1.r256> does not exist in the storage array.	This error indicates that the requested group for checking is not available in the storage array. Contact your storage administrator and validate the finding.
	Invalid volume state.	[2010-05-27 16:48:24.953 'TPDSrm.checkTestFailoverStart.Run' 3PAR_1021 error (id=860)] Error. The secondary volumes are not in Synced state.	This error indicates that the volumes participated in the Remote Copy group are not in sync. If the Remote Copy group is started and the Remote Copy link is healthy, SRA requires all volumes to be in synced state for test failover operation.

Workflow chart



testFailoverStart

The testFailoverStart command creates writable temporary copies of the requested replication targets and presents these copies to the requested hosts. Since HP 3PAR's Remote Copy group is not mapped to a specific host in the array level, HP 3PAR SRA will support the dynamic access restriction, which indicates that SRM will specify the set of ESX hosts that require access to failed-over devices. Each host is described as an initiator with a WWN and type (Fibre Channel or ISCSI). Initiators are organized in groups with unique identifiers called access groups. The exact grouping mechanism is opaque to SRA. In practice each group corresponds to a standalone ESX host or a cluster of ESX hosts.

SRM expects the SRA to perform the following:

- The response from testFailoverStart must contain the same set of standalone devices (not supported by HP 3PAR SRA) and consistency groups as specified in the request
- Allow different devices within the same consistency group to request access to different sets of hosts
- Create testing read-write snapshots and present them to the specified hosts without disrupting ongoing replication process
- Return snapshot information with identification

Troubleshooting checklist

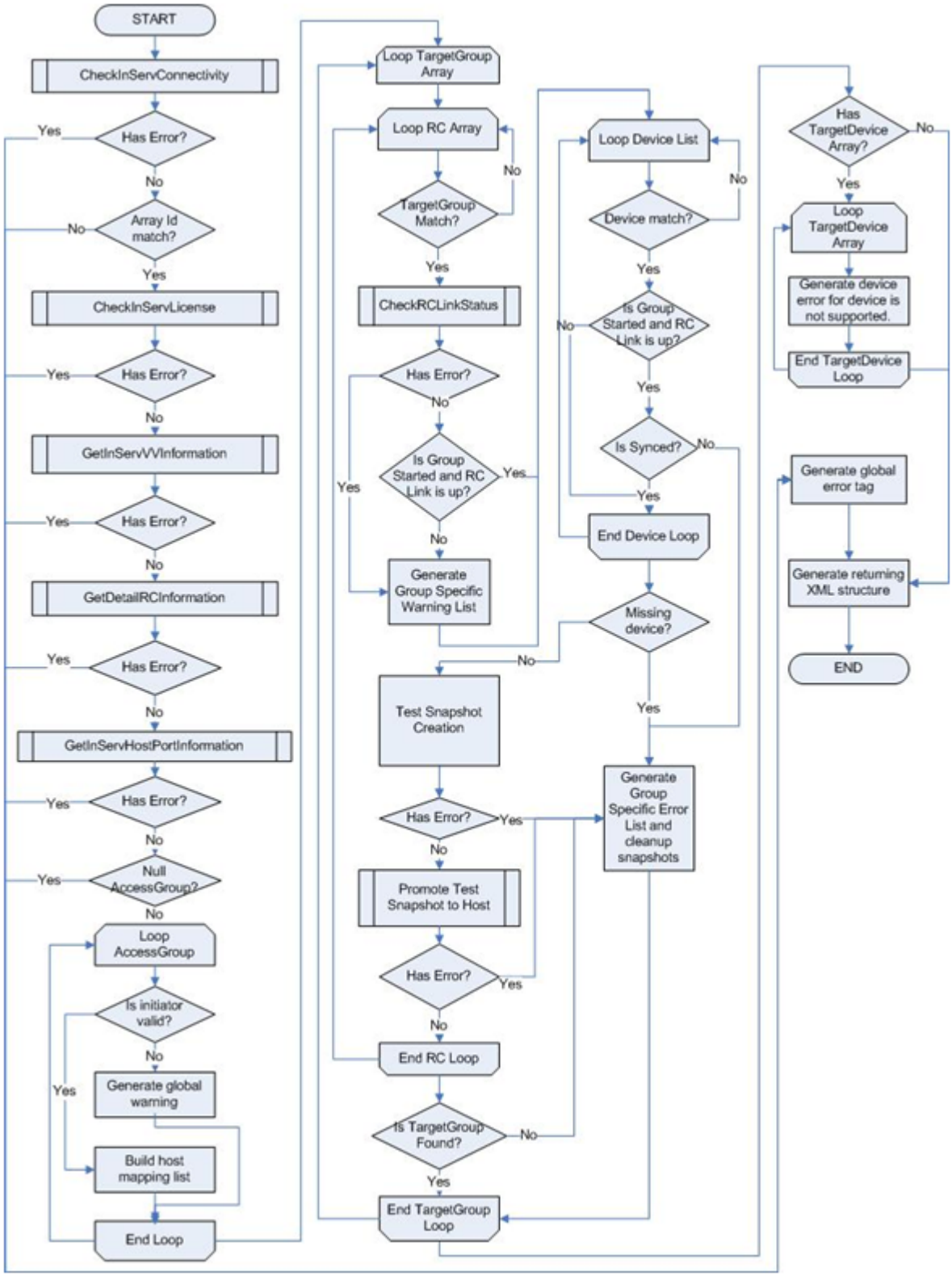
Table 9 testFailoverStart Troubleshooting Checklist

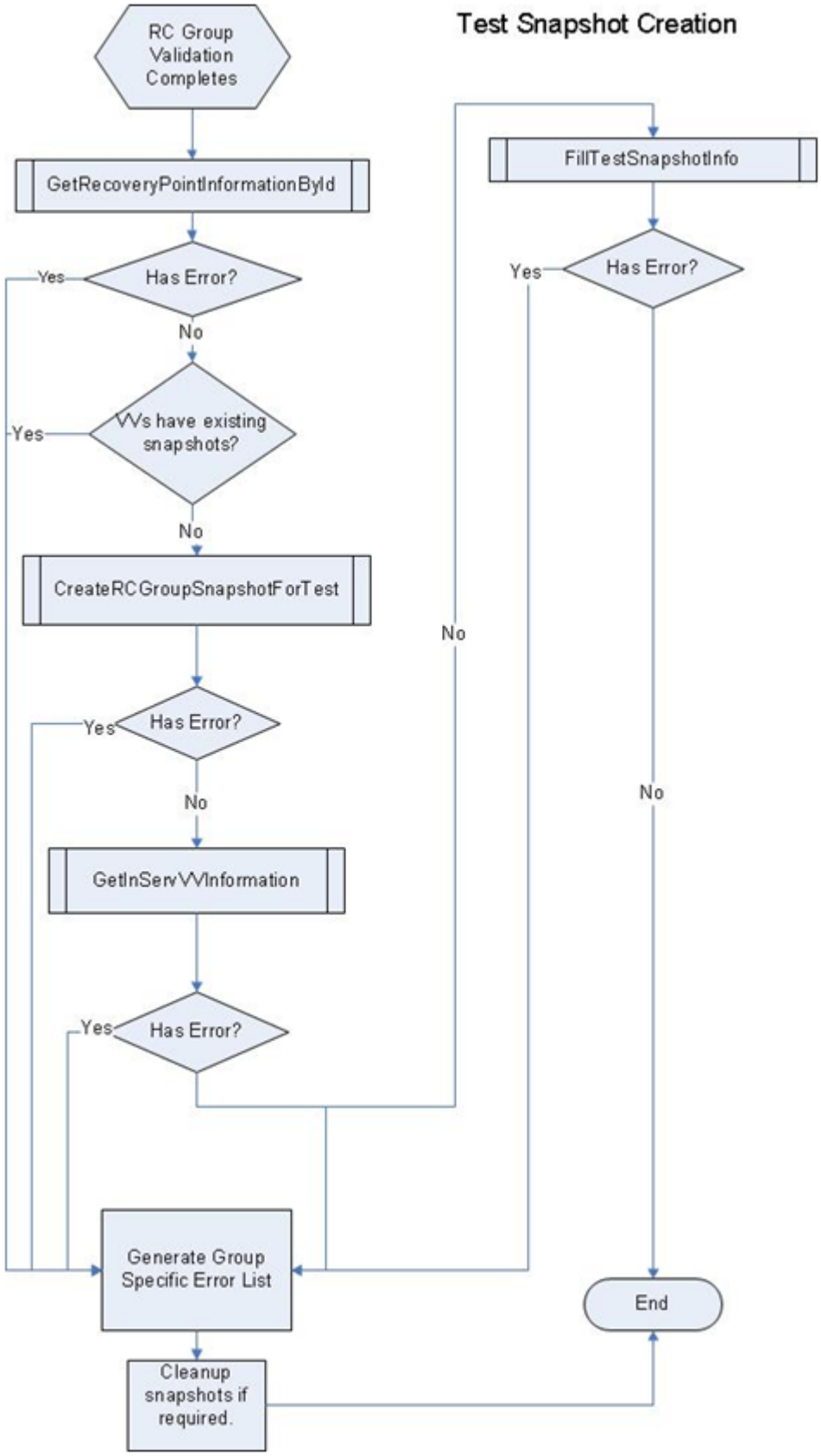
Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check log file path.	Missing log file path information in the input XML.	[2010-05-26 14:29:32.966 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2014 warning (id=1052)] Warning. Unable to access the specified log folder. The log file will be available at the following location: <C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\3PARInServ>.	This error means that the input XML file does not contain log file path and the logs generated with this command will be saved to the folder indicated.
Load default resource dll.	Missing the resource file.	[2010-05-26 18:00:07.531 'SetLogFolder' 3PAR_1001 info (id=6132)] Could not find any resources appropriate for the specified culture or the neutral culture. Make sure "TPDSrm.MessageString.resources" was correctly embedded or linked into assembly "TPDSrm" at compile time, or that all the satellite assemblies required are loadable and fully signed.	This error means that the default `TPDSrm.resources.dll` file is missing from installation. Reinstall the package to repair the file.
Check HP 3PAR Storage System connectivity.	Connection error	[2010-05-27 10:33:40.062 'arrayMgm.CheckInServConnectivity' 3PAR_1007 error (id=4056)] Error. Unable to get system information. Additional information: login failed - Invalid user or password.	This error indicates that the user name or password is invalid.
Check HP 3PAR Storage System ID.	The requested array ID does not match connected storage array.	[2010-05-27 16:59:32.796 'TPDSrm.discoverDevices.Run' 3PAR_1012 error (id=4616)] Error. Array id <347> does not match the connected HP 3PAR Storage System.	This error indicates that the connected storage array has a different system id than the requested input.
Check HP 3PAR Storage System license.	Missing required license on system.	[2010-05-27 11:36:25.156 'TPDSrm.arrayMgm.CheckInServLicense' 3PAR_1014 error (id=4180)] Error. Missing	This error indicates that required license is missing. HP 3PAR SRA requires the HP 3PAR Storage System

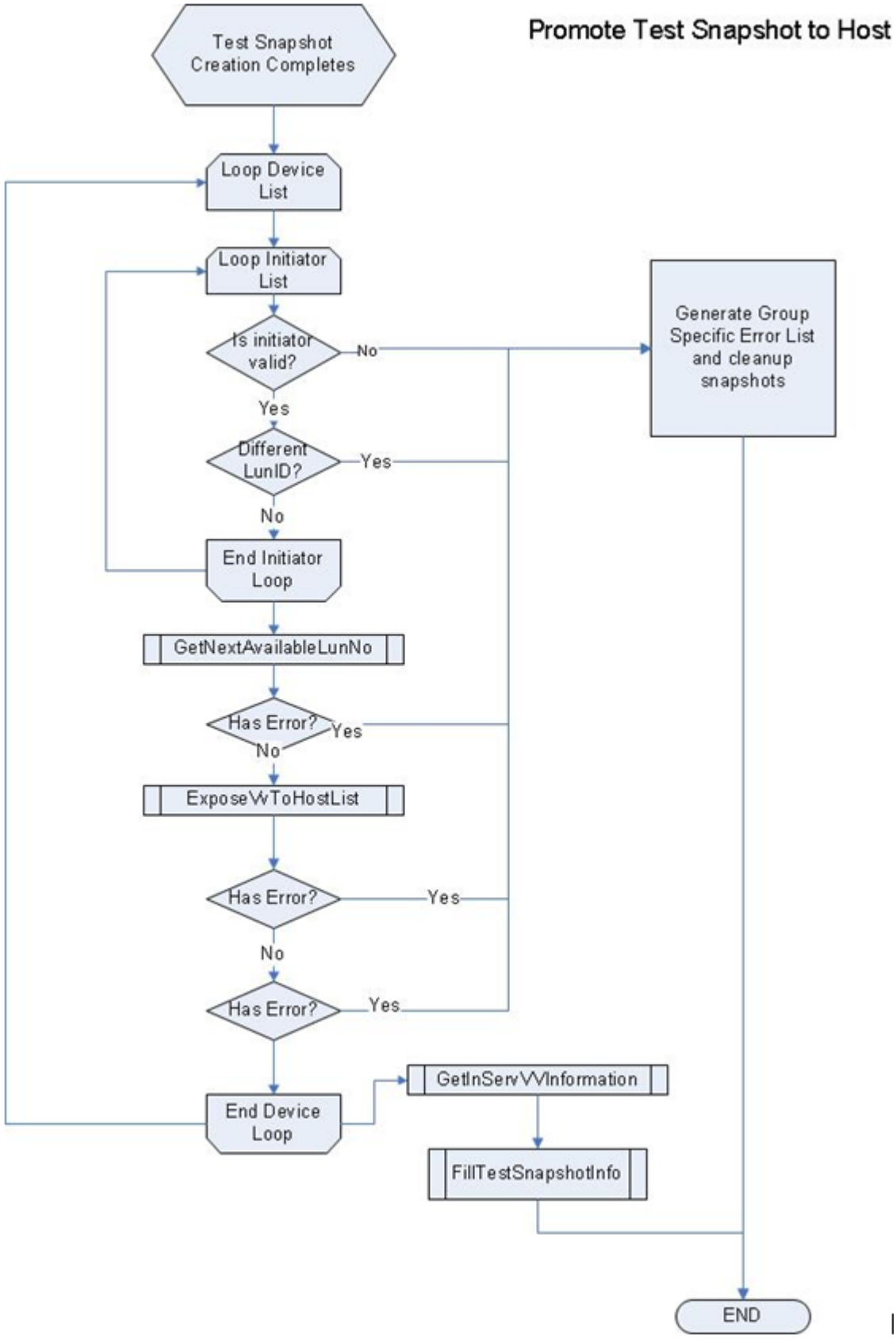
Table 9 testFailoverStart Troubleshooting Checklist *(continued)*

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
		required <Virtual Copy> license on the connected HP 3PAR Storage System.	to have both Remote Copy Software and Virtual Copy Software licenses.
Get Virtual Volume information on the HP 3PAR Storage System	Missing expected output content from storage.	[2010-05-27 10:58:47.031 'TPDSrm.checkTestFailoverStart.Run' 3PAR_1018 error (id=5432)] Error. Unable to get detail virtual volume information. Additional information: <xxxx>	This error indicates that storage array returns empty output for the command issued. This can be caused by intermittent network interruption.
Get host exposure mapping list.	Missing expected output content from storage	[2010-05-27 10:58:47.031 'TPDSrm.testFailoverStart.Run' 3PAR_1032 error (id=5432)] Error. Unable to get detail InServ host information. Additional information: {xxxx}	This error indicates that storage array returns empty output for the command issued. This might be caused by intermittent network interrupt.
Check Remote Copy group status.	Invalid Remote Copy group.	[2010-05-27 16:33:37.734 'TPDSrm.testFailoverStart.Run' 3PAR_1022 error (id=1580)] Error. The specified group <MmmtGroup1.r26> does not exist in the storage array.	This error indicates that the requested group for checking is not available in the storage array. Contact your storage administrator and validate the finding.
	Invalid volume state.	[2010-05-27 16:48:24.953 'TPDSrm.testFailoverStart.Run' 3PAR_1021 error (id=860)] Error. The secondary volumes are not in Synced state.	This error indicates that the volumes participated in the Remote Copy groups are not in sync. If the Remote Copy group is started and the Remote Copy link is healthy, HP 3PAR SRA requires all volumes to be in synced state for test failover operation.
Validate initiator list.	Invalid initiator found.	[2010-05-27 17:07:22.593 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2008 warning (id=1348)] Warning. Unable to identify <aa:aa:aa:aa:aa:aa:aa:aa> to be a registered host in HP 3PAR Storage System.	This error indicates that the specified initiator given by SRM is not a valid host entry in the storage server.

Worflow chart




Test Snapshot Creation
RC Group Validation Completes
GetRecoveryPointInformationById
Has Error?
Yes
No
VVs have existing snapshots?
Yes
No
CreateRCGroupSnapshotForTest
Has Error?
Yes
No
GetInServVVInformation
Has Error?
Yes
FillTestSnapshotInfo
Has Error?
Yes
No
No
Generate Group Specific Error List
End
Cleanup snapshots if required.


Promote Test Snapshot to Host
Test Snapshot Creation Completes
Loop Device List
Loop Initiator List
Is initiator valid?
No
Yes
Different LunID?
Yes
No
End Initiator Loop
GetNextAvailableLunNo
Has Error?
Yes
No
ExposeVvToHostList
Has Error?
Yes
No
Has Error?
Yes
End Device Loop
GetInServVVInformation
FillTestSnapshotInfo
Generate Group Specific Error List and cleanup snapshots
END

testFailoverStop

The testFailoverStop command deletes the temporary copies created by testFailoverStart command. Once HP 3PAR SRA receives this command, it should remove all test snapshots pertaining to the specified group.

The following is expected from SRA:

- This command must not affect replication
- The response must contain the same set of standalone devices and consistency groups as specified in the request
- The response should contain status of this operation pertaining to each group

Troubleshooting checklist

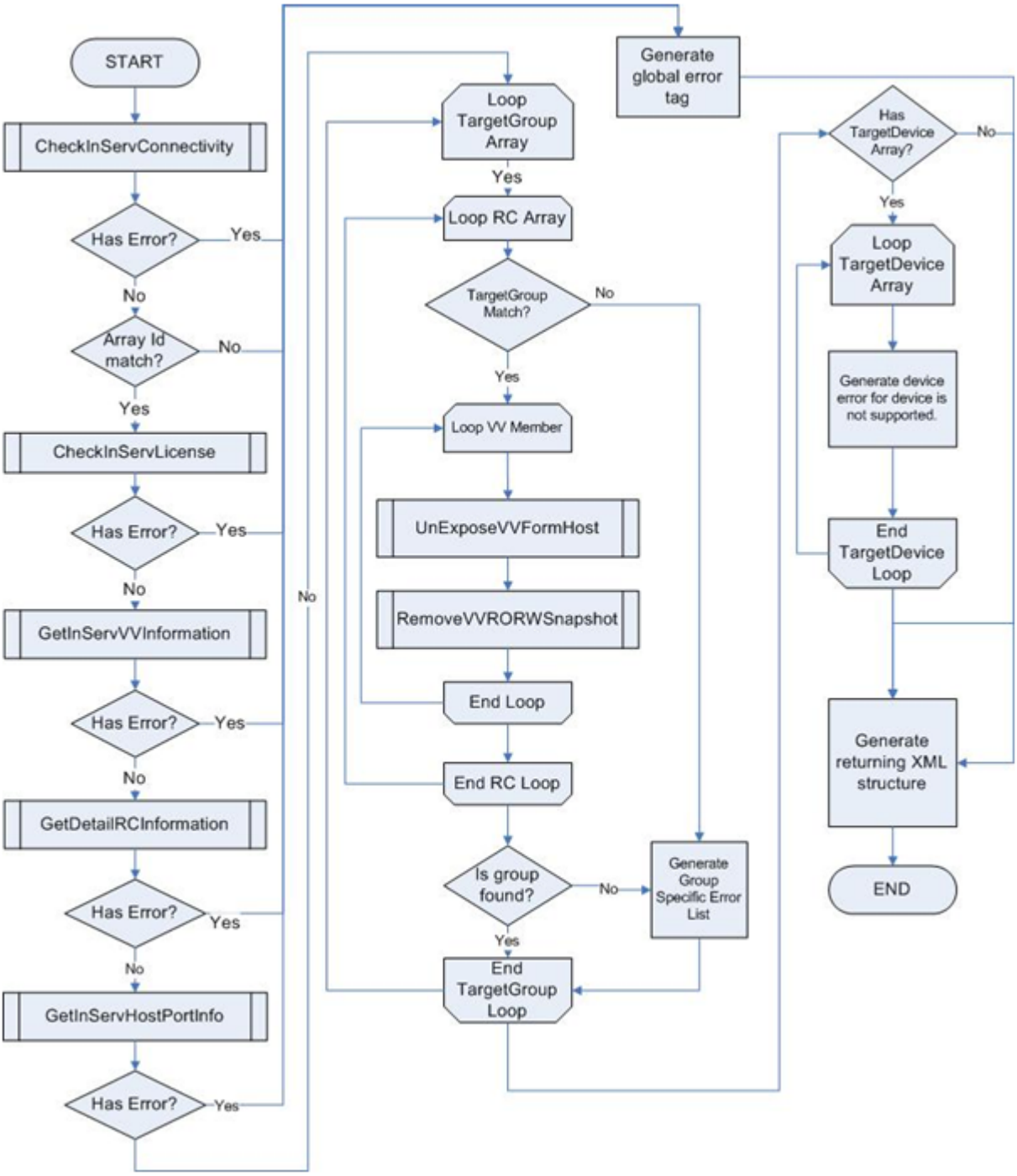
Table 10 testFailoverStop Troubleshooting Checklist

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check log file path.	Missing log file path information in the input XML.	[2010-05-26 14:29:32.966 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2014 warning (id=1052)] Warning. Unable to access the specified log folder. The log file will be available at the following location: <C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\3PARInServ>.	This error means that the input XML file does not contain log file path and the logs generated with this command will be saved to the folder indicated.
Load default resource dll.	Missing the resource file.	[2010-05-26 18:00:07.531 'SetLogFolder' 3PAR_1001 info (id=6132)] Could not find any resources appropriate for the specified culture or the neutral culture. Make sure "TPDSrm.MessageString.resources" was correctly embedded or linked into assembly "TPDSrm" at compile time, or that all the satellite assemblies required are loadable and fully signed.	This error means that the default `TPDSrm.resources.dll` file is missing from installation. Reinstall the package to repair the file.
Check HP 3PAR Storage System connectivity.	Connection error	[2010-05-27 10:33:40.062 'arrayMgm.CheckInServConnectivity' 3PAR_1007 error (id=4056)] Error. Unable to get system information. Additional information: login failed - Invalid user or password.	This error indicates that the user name or password is invalid.
Check HP 3PAR Storage System ID.	The requested array ID does not match connected storage array.	[2010-05-27 16:59:32.796 'TPDSrm.discoverDevices.Run' 3PAR_1012 error (id=4616)] Error. Array id <347> does not match the connected HP 3PAR Storage System.	This error indicates that the connected storage array has a different system id than the requested input.
Check HP 3PAR Storage System license.	Missing required license on system.	[2010-05-27 11:36:25.156 'TPDSrm.arrayMgm.CheckInServLicense' 3PAR_1014 error (id=4180)] Error. Missing required <Virtual Copy> license on the connected HP 3PAR Storage System.	This error indicates that required license is missing. HP 3PAR SRA requires the HP 3PAR Storage System to have both Remote Copy Software and Virtual Copy Software licenses.
Get Virtual Volume information on the HP 3PAR Storage System	Missing expected output content from storage.	[2010-05-27 10:58:47.031 'TPDSrm. checkTestFailoverStart.Run' 3PAR_1018 error (id=5432)] Error. Unable to get detail virtual volume information. Additional information: <xxxx>	This error indicates that storage array returns empty output for the command issued. This can be caused by intermittent network interruption.

Table 10 testFailoverStop Troubleshooting Checklist *(continued)*

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Get host exposure mapping list.	Missing expected output content from storage	[2010-05-27 10:58:47.031 'TPDSrm. testFailoverStart.Run' 3PAR_1032 error (id=5432)] Error. Unable to get detail InServ host information. Additional information: {xxxx}	This error indicates that storage array returns empty output for the command issued. This might be caused by intermittent network interrupt.
Check Remote Copy group status.	Invalid Remote Copy group.	[2010-05-27 16:33:37.734 'TPDSrm. testFailoverStart.Run' 3PAR_1022 error (id=1580)] Error. The specified group <MmmtGroup1.r26> does not exist in the storage array.	This error indicates that the requested group for checking is not available in the storage array. Contact your storage administrator and validate the finding.
	Invalid volume state.	[2010-05-27 16:48:24.953 'TPDSrm. testFailoverStart.Run' 3PAR_1021 error (id=860)] Error. The secondary volumes are not in Synced state.	This error indicates that the volumes participated in the Remote Copy groups are not in sync. If the Remote Copy group is started and the Remote Copy link is healthy, HP 3PAR SRA requires all volumes to be in synced state for test failover operation.
Validate initiator list.	Invalid initiator found.	[2010-05-27 17:07:22.593 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2008 warning (id=1348)] Warning. Unable to identify <aa:aa:aa:aa:aa:aa:aa:aa> to be a registered host in HP 3PAR Storage System.	This error indicates that the specified initiator given by SRM is not a valid host entry in the storage server.

Workflow chart



checkFailover

The checkFailover command validates environment and target devices before failover. This command is expected to perform various configuration and runtime state checks on the specified target devices and identify problems which will prevent successful failover.

SRM expects the HP 3PAR SRA to perform the following check:

- Initial data synchronization has completed and there is a copy of the production data ready for failover
- There is a valid license to perform failover operation

Troubleshooting Checklist

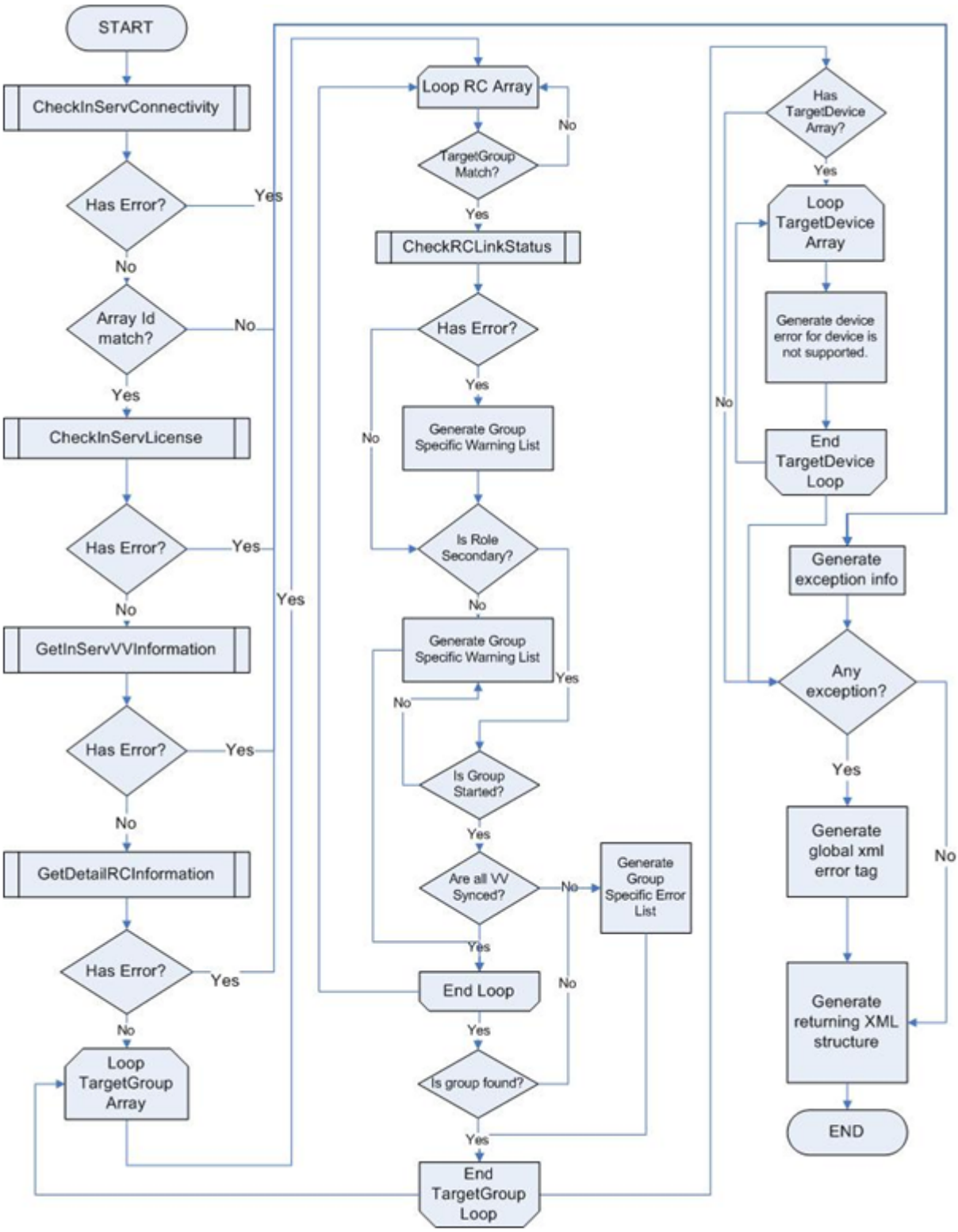
Table 11 checkFailover Troubleshooting Checklist

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check log file path.	Missing log file path information in the input XML.	[2010-05-26 14:29:32.966 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2014 warning (id=1052)] Warning. Unable to access the specified log folder. The log file will be available at the following location: <C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\3PARInServ>.	This error means that the input XML file does not contain log file path and the logs generated with this command will be saved to the folder indicated.
Load default resource dll.	Missing the resource file.	[2010-05-26 18:00:07.531 'SetLogFolder' 3PAR_1001 info (id=6132)] Could not find any resources appropriate for the specified culture or the neutral culture. Make sure "TPDSrm.MessageString.resources" was correctly embedded or linked into assembly "TPDSrm" at compile time, or that all the satellite assemblies required are loadable and fully signed.	This error means that the default `TPDSrm.resources.dll` file is missing from installation. Reinstall the package to repair the file.
Check HP 3PAR Storage System connectivity.	Connection error	[2010-05-27 10:33:40.062 'arrayMgm.CheckInServConnectivity' 3PAR_1007 error (id=4056)] Error. Unable to get system information. Additional information: login failed - Invalid user or password.	This error indicates that the user name or password is invalid.
Check HP 3PAR Storage System ID.	The requested array ID does not match connected storage array.	[2010-05-27 16:59:32.796 'TPDSrm.discoverDevices.Run' 3PAR_1012 error (id=4616)] Error. Array id <347> does not match the connected HP 3PAR Storage System.	This error indicates that the connected storage array has a different system id than the requested input.
Check HP 3PAR Storage System license.	Missing required license on system.	[2010-05-27 11:36:25.156 'TPDSrm.arrayMgm.CheckInServLicense' 3PAR_1014 error (id=4180)] Error. Missing required <Virtual Copy> license on the connected HP 3PAR Storage System.	This error indicates that required license is missing. HP 3PAR SRA requires the HP 3PAR Storage System to have both Remote Copy Software and Virtual Copy Software licenses.
Get Virtual Volume information on the HP 3PAR Storage System	Missing expected output content from storage.	[2010-05-27 10:58:47.031 'TPDSrm. checkTestFailoverStart.Run' 3PAR_1018 error (id=5432)] Error. Unable to get detail virtual volume information. Additional information: <xxxx>	This error indicates that storage array returns empty output for the command issued. This can be caused by intermittent network interruption.

Table 11 checkFailover Troubleshooting Checklist *(continued)*

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check Remote Copy group status.	Invalid Remote Copy group.	[2010-05-27 16:33:37.734 'TPDSrm.testFailoverStart.Run' 3PAR_1022 error (id=1580)] Error. The specified group <MmmtGroup1.r26> does not exist in the storage array.	This error indicates that the requested group for checking is not available in the storage array. Contact your storage administrator and validate the finding.
	Invalid volume state.	[2010-05-27 16:48:24.953 'TPDSrm.testFailoverStart.Run' 3PAR_1021 error (id=860)] Error. The secondary volumes are not in Synced state.	This error indicates that the volumes participated in the Remote Copy groups are not in sync. If the Remote Copy group is started and the Remote Copy link is healthy, HP 3PAR SRA requires all volumes to be in synced state for test failover operation.
	Remote Copy group is not started.	[2010-05-27 17:44:41.375 'TPDSrm.checkFailover.Run' 3PAR_2003 warning (id=5636)] Warning. Remote Copy Group <srmgrp.r256> might not be in sync.	This warning indicates that the Remote Copy link is up, but the Remote Copy group is not started. If the user chooses to perform failover despite the warning message, the data in the target site will not be consistent with the data on the source site.

Workflow chart



prepareFailover

The prepareFailover command is issued at the protected site before failover to make the source device read-only and takes a snapshot of these devices in anticipation of a failover.

SRM expects the HP 3PAR SRA to perform the following:

- The response from prepareFailover must contain the same set of standalone devices (not supported by HP 3PAR SRA) and consistency groups as specified in the request
- Make sure the source device is read-only and optionally takes a snapshot of the source devices

Troubleshooting Checklist

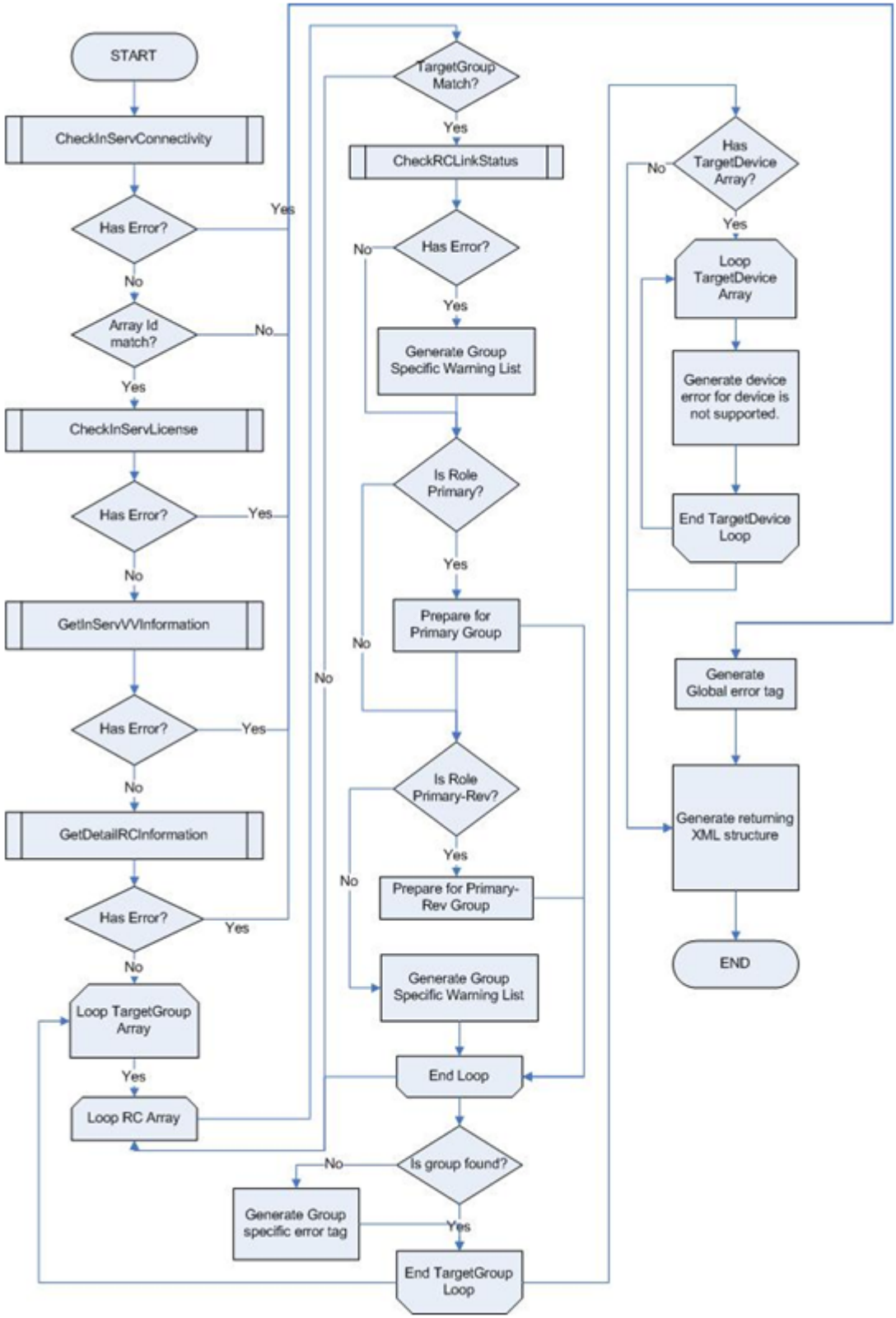
Table 12 prepareFailover Troubleshooting Checklist

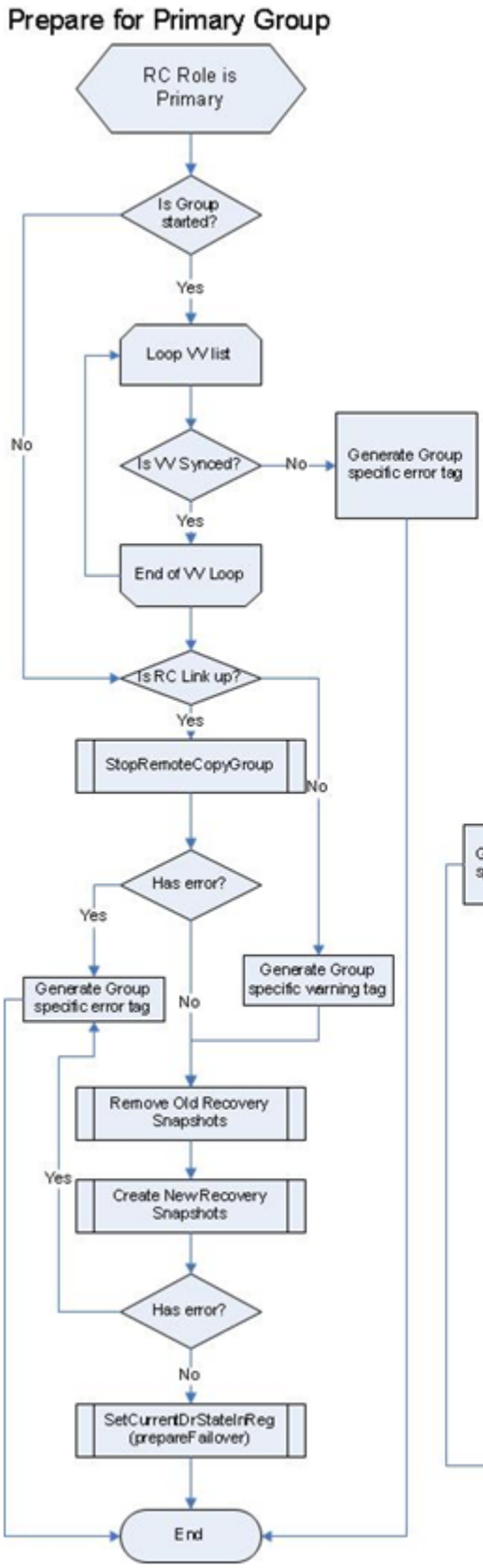
Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check log file path.	Missing log file path information in the input XML.	[2010-05-26 14:29:32.966 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2014 warning (id=1052)] Warning. Unable to access the specified log folder. The log file will be available at the following location: <C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\3PARInServ>.	This error means that the input XML file does not contain log file path and the logs generated with this command will be saved to the folder indicated.
Load default resource dll.	Missing the resource file.	[2010-05-26 18:00:07.531 'SetLogFolder' 3PAR_1001 info (id=6132)] Could not find any resources appropriate for the specified culture or the neutral culture. Make sure "TPDSrm.MessageString.resources" was correctly embedded or linked into assembly "TPDSrm" at compile time, or that all the satellite assemblies required are loadable and fully signed.	This error means that the default `TPDSrm.resources.dll` file is missing from installation. Reinstall the package to repair the file.
Check HP 3PAR Storage System connectivity.	Connection error	[2010-05-27 10:33:40.062 'arrayMgm.CheckInServConnectivity' 3PAR_1007 error (id=4056)] Error. Unable to get system information. Additional information: login failed - Invalid user or password.	This error indicates that the user name or password is invalid.
Check HP 3PAR Storage System ID.	The requested array ID does not match connected storage array.	[2010-05-27 16:59:32.796 'TPDSrm.discoverDevices.Run' 3PAR_1012 error (id=4616)] Error. Array id <347> does not match the connected HP 3PAR Storage System.	This error indicates that the connected storage array has a different system id than the requested input.
Check HP 3PAR Storage System license.	Missing required license on system.	[2010-05-27 11:36:25.156 'TPDSrm.arrayMgm.CheckInServLicense' 3PAR_1014 error (id=4180)] Error. Missing required <Virtual Copy> license on the connected HP 3PAR Storage System.	This error indicates that required license is missing. HP 3PAR SRA requires the HP 3PAR Storage System to have both Remote Copy Software and Virtual Copy Software licenses.
Get Virtual Volume information on the HP 3PAR Storage System	Missing expected output content from storage.	[2010-05-27 10:58:47.031 'TPDSrm. checkTestFailoverStart.Run' 3PAR_1018 error (id=5432)] Error. Unable to get detail virtual volume information. Additional information: <xxxx>	This error indicates that storage array returns empty output for the command issued. This can be caused by intermittent network interruption.
Check Remote Copy group status.	Invalid Remote Copy group.	[2010-05-27 16:33:37.734 'TPDSrm. testFailoverStart.Run' 3PAR_1022 error (id=1580)] Error. The specified group <MmmtGroup1.r26> does not exist in the storage array.	This error indicates that the requested group for checking is not available in the storage array. Contact your storage

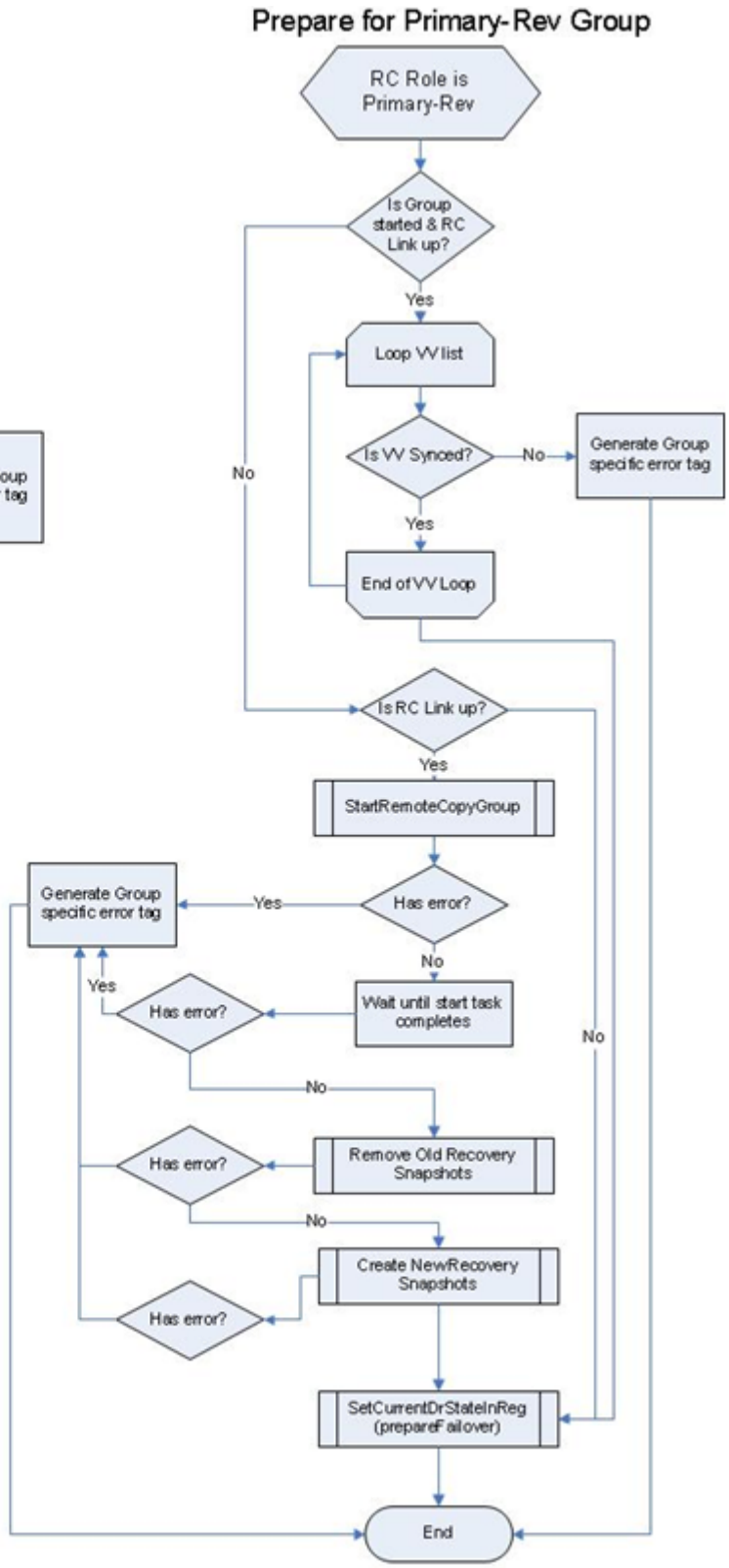
Table 12 prepareFailover Troubleshooting Checklist *(continued)*

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
			administrator and validate the finding.
	Invalid volume state.	[2010-05-27 16:48:24.953 'TPDSrm. testFailoverStart.Run' 3PAR_1021 error (id=860)] Error. The secondary volumes are not in Synced state.	This error indicates that the volumes participated in the Remote Copy groups are not in sync. If the Remote Copy group is started and the Remote Copy link is healthy, HP 3PAR SRA requires all volumes to be in synced state for test failover operation.
	Remote Copy group is not started.	[2010-05-27 17:44:41.375 'TPDSrm.checkFailover.Run' 3PAR_2003 warning (id=5636)] Warning. Remote Copy Group <srmgrp.r256> might not be in sync.	This warning indicates that the Remote Copy link is up, but the Remote Copy group is not started. If the user chooses to perform failover despite the warning message, the data in the target site will not be consistent with the data on the source site.
Stop Remote Copy group	Remote Copy group cannot be stopped.	[2010-05-28 14:48:13.500 'TPDSrm.prepareFailover.Run' 3PAR_1038 error (id=1992)] Error. Wait for promote completion has timed out on Remote Copy Group <srm_cancun>.	This error message indicates that HP 3PAR SRA encountered a 12 hour timeout while waiting for the Remote Copy group to stop completely. This is occurs when the volume promotion operation takes longer than expected for the Remote Copy group. This operation will be performed if Remote Copy group has a Primary role.

Workflow chart




Prepare for Primary Group
RC Role is Primary
Is Group started?
Yes
No
Loop VV list
Is VV Synced?
No
Generate Group specific error tag
Yes
End of VV Loop
Is RC Link up?
Yes
No
StopRemoteCopyGroup
No
Has error?
Yes
Generate Group specific error tag
No
Generate Group specific warning tag
Remove Old Recovery Snapshots
Yes
Create NewRecovery Snapshots
Has error?
No
SetCurrentDrStateInReg (prepareFailover)
End


Prepare for Primary-Rev Group
RC Role is Primary-Rev
Is Group started & RC Link up?
Yes
No
Loop VV list
Is VV Synced?
No
Generate Group specific error tag
Yes
End of VV Loop
Is RC Link up?
Yes
No
StartRemoteCopyGroup
Has error?
Yes
Generate Group specific error tag
No
Wait until start task completes
Has error?
Yes
No
Remove Old Recovery Snapshots
Has error?
No
Create NewRecovery Snapshots
Has error?
SetCurrentDrStateInReg (prepareFailover)
End

failover

The failover command stops replication for the requested replication targets, makes writable devices from these targets, and presents these devices to requested hosts.

SRM expects the HP 3PAR SRA to perform the following:

- The response from failover must contain the same set of standalone devices (not supported by HP 3PAR SRA) and consistency groups as specified in the request
- It is allowed that different devices within the same consistency group request access to different sets of hosts.
- If any device under a group failed to make exposure to the group, it is considered a failure
- Return TargetDevice information with identification and attributes

Troubleshooting checklist

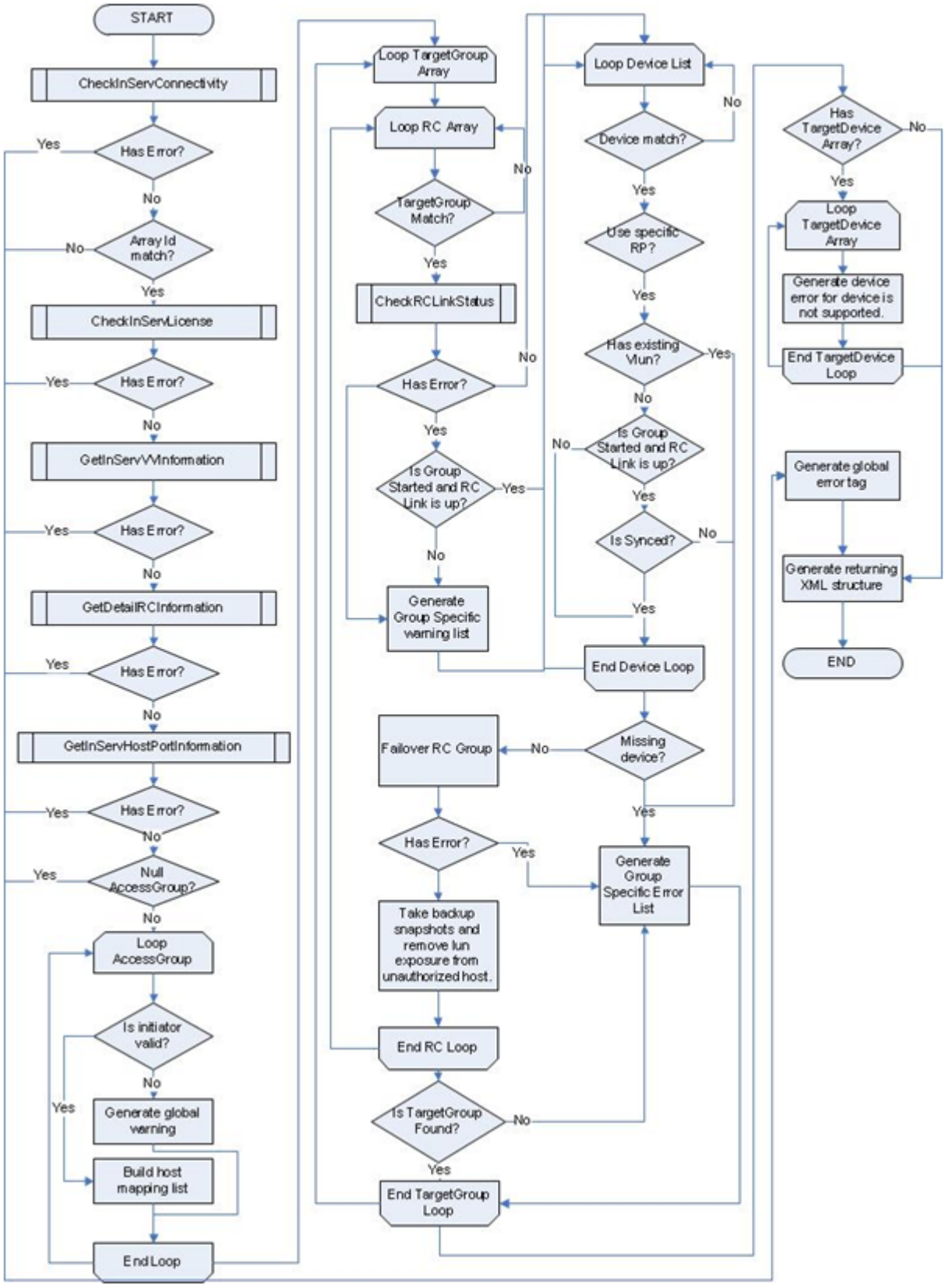
Table 13 failover Troubleshooting Checklist

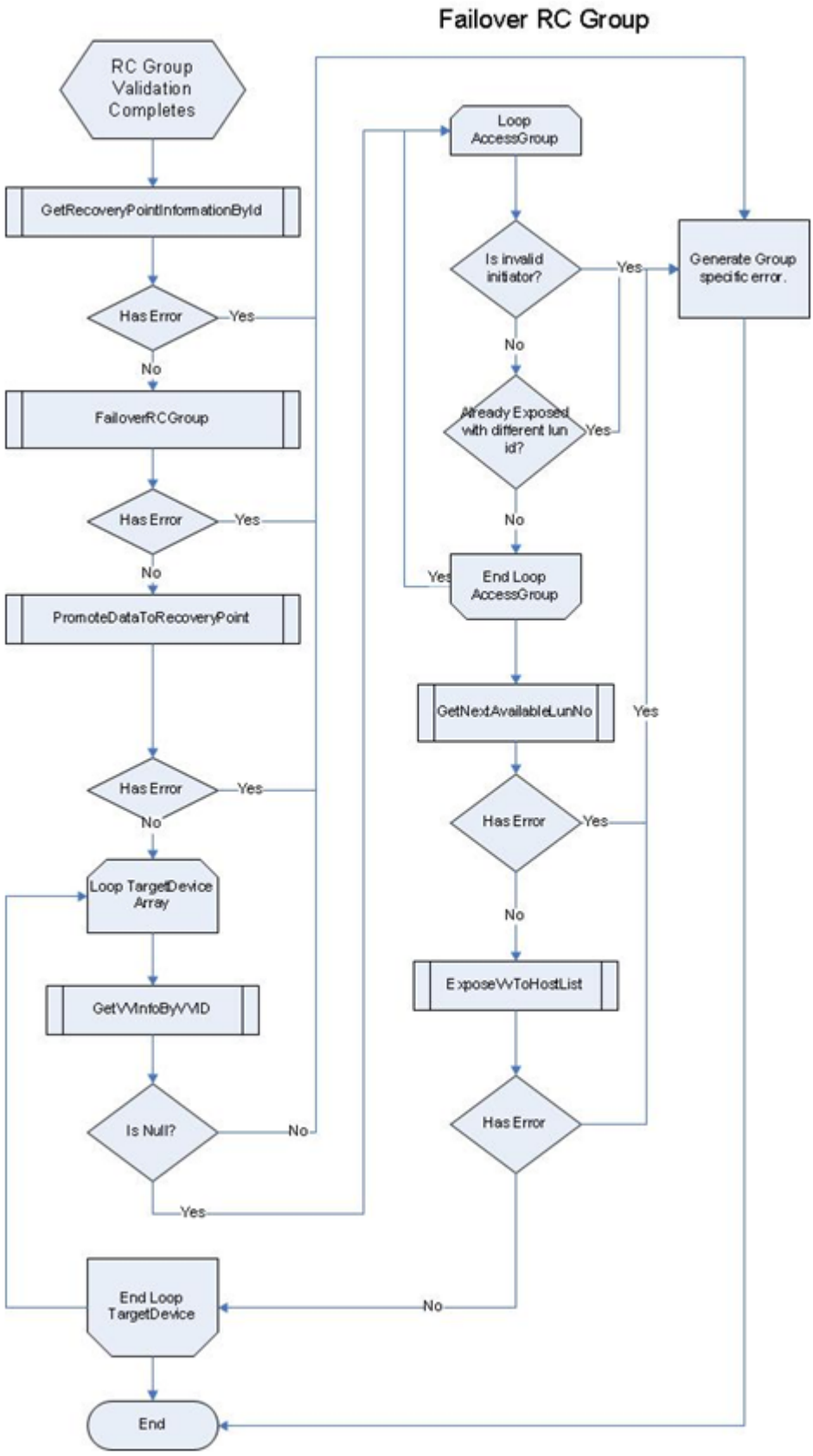
Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check log file path.	Missing log file path information in the input XML.	[2010-05-26 14:29:32.966 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2014 warning (id=1052)] Warning. Unable to access the specified log folder. The log file will be available at the following location: <C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\3PARInServ>.	This error means that the input XML file does not contain log file path and the logs generated with this command will be saved to the folder indicated.
Load default resource dll.	Missing the resource file.	[2010-05-26 18:00:07.531 'SetLogFolder' 3PAR_1001 info (id=6132)] Could not find any resources appropriate for the specified culture or the neutral culture. Make sure "TPDSrm.MessageString.resources" was correctly embedded or linked into assembly "TPDSrm" at compile time, or that all the satellite assemblies required are loadable and fully signed.	This error means that the default `TPDSrm.resources.dll` file is missing from installation. Reinstall the package to repair the file.
Check HP 3PAR Storage System connectivity.	Connection error	[2010-05-27 10:33:40.062 'arrayMgm.CheckInServConnectivity' 3PAR_1007 error (id=4056)] Error. Unable to get system information. Additional information: login failed - Invalid user or password.	This error indicates that the user name or password is invalid.
Check HP 3PAR Storage System ID.	The requested array ID does not match connected storage array.	[2010-05-27 16:59:32.796 'TPDSrm.discoverDevices.Run' 3PAR_1012 error (id=4616)] Error. Array id <347> does not match the connected HP 3PAR Storage System.	This error indicates that the connected storage array has a different system id than the requested input.
Check HP 3PAR Storage System license.	Missing required license on system.	[2010-05-27 11:36:25.156 'TPDSrm.arrayMgm.CheckInServLicense' 3PAR_1014 error (id=4180)] Error. Missing required <Virtual Copy> license on the connected HP 3PAR Storage System.	This error indicates that required license is missing. HP 3PAR SRA requires the HP 3PAR Storage System to have both Remote Copy Software and Virtual Copy Software licenses.
Get Virtual Volume information on the HP 3PAR Storage System	Missing expected output content from storage.	[2010-05-27 10:58:47.031 'TPDSrm. checkTestFailoverStart.Run' 3PAR_1018 error (id=5432)] Error. Unable to get detail virtual volume information. Additional information: <xxxx>	This error indicates that storage array returns empty output for the command issued. This can be caused by intermittent network interruption.

Table 13 failover Troubleshooting Checklist *(continued)*

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check Remote Copy group status.	Invalid Remote Copy group.	[2010-05-27 16:33:37.734 'TPDSrm. testFailoverStart.Run' 3PAR_1022 error (id=1580)] Error. The specified group <MmmtGroup1.r26> does not exist in the storage array.	This error indicates that the requested group for checking is not available in the storage array. Contact your storage administrator and validate the finding.
	Invalid volume state.	[2010-05-27 16:48:24.953 'TPDSrm. testFailoverStart.Run' 3PAR_1021 error (id=860)] Error. The secondary volumes are not in Synced state.	This error indicates that the volumes participated in the Remote Copy groups are not in sync. If the Remote Copy group is started and the Remote Copy link is healthy, HP 3PAR SRA requires all volumes to be in synced state for test failover operation.
	Remote Copy group is not started.	[2010-05-27 17:44:41.375 'TPDSrm.checkFailover.Run' 3PAR_2003 warning (id=5636)] Warning. Remote Copy Group <srmgrp.r256> might not be in sync.	This warning indicates that the Remote Copy link is up, but the Remote Copy group is not started. If the user chooses to perform failover despite the warning message, the data in the target site will not be consistent with the data on the source site.
Stop Remote Copy group.	Remote Copy group cannot be stopped.	[2010-05-28 14:48:13.500 'TPDSrm.prepareFailover.Run' 3PAR_1038 error (id=1992)] Error. Wait for promote completion has timed out on Remote Copy Group <srm_cancun>.	This error message indicates that HP 3PAR SRA encountered a 12 hour timeout while waiting for the Remote Copy group to stop completely. This is occurs when the volume promotion operation takes longer than expected for the Remote Copy group. This operation will be performed if Remote Copy group has a Primary role.
Restore Remote Copy group.	Fail to restore Remote Copy group.	[2010-05-28 16:29:44.812 'TPDSrm.arrayMgm.FailoverRCGroup' 3PAR_1042 error (id=3944)] Error. Unable to restore the Remote Copy Group remotely. Additional information: Error in setrcopygroup: Command failed on target system RC_S419_SYNC, returned error: No valid groups found for setrcopygroup operation.	Remote Copy group restoration is performed only when the group is engaged in the double failover scenario. To execute this successfully, the Remote Copy group must be in the started state.

Workflow chart




Failover RC Group
RC Group Validation Completes
GetRecoveryPointInformationById
Has Error
Yes
No
FailoverRCGroup
Has Error
Yes
No
PromoteDataToRecoveryPoint
Has Error
Yes
No
Loop TargetDevice Array
GetVVInfoByVVID
Is Null?
No
Yes
End Loop TargetDevice
End
Loop AccessGroup
Is invalid initiator?
Yes
Generate Group specific error.
No
Already Exposed with different lun id?
Yes
No
Yes
End Loop AccessGroup
GetNextAvailableLunNo
Yes
Has Error
Yes
No
ExposeVvToHostList
Has Error
No

prepareReverseReplication

The prepareReverseReplication command initiates the replication in reverse. After this command, the TargetGroup becomes the ConsistencyGroup and the ConsistencyGroup becomes the TargetGroup.

This command is executed at the replication source.

SRM expects the HP 3PAR SRA to perform the following:

- The response from prepareReverseReplication must contain the same set of standalone devices (not supported by HP 3PAR SRA) and consistency groups as specified in the request
- The implementation of this command must be non-disruptive to production services running at the recovery site

Troubleshooting checklist

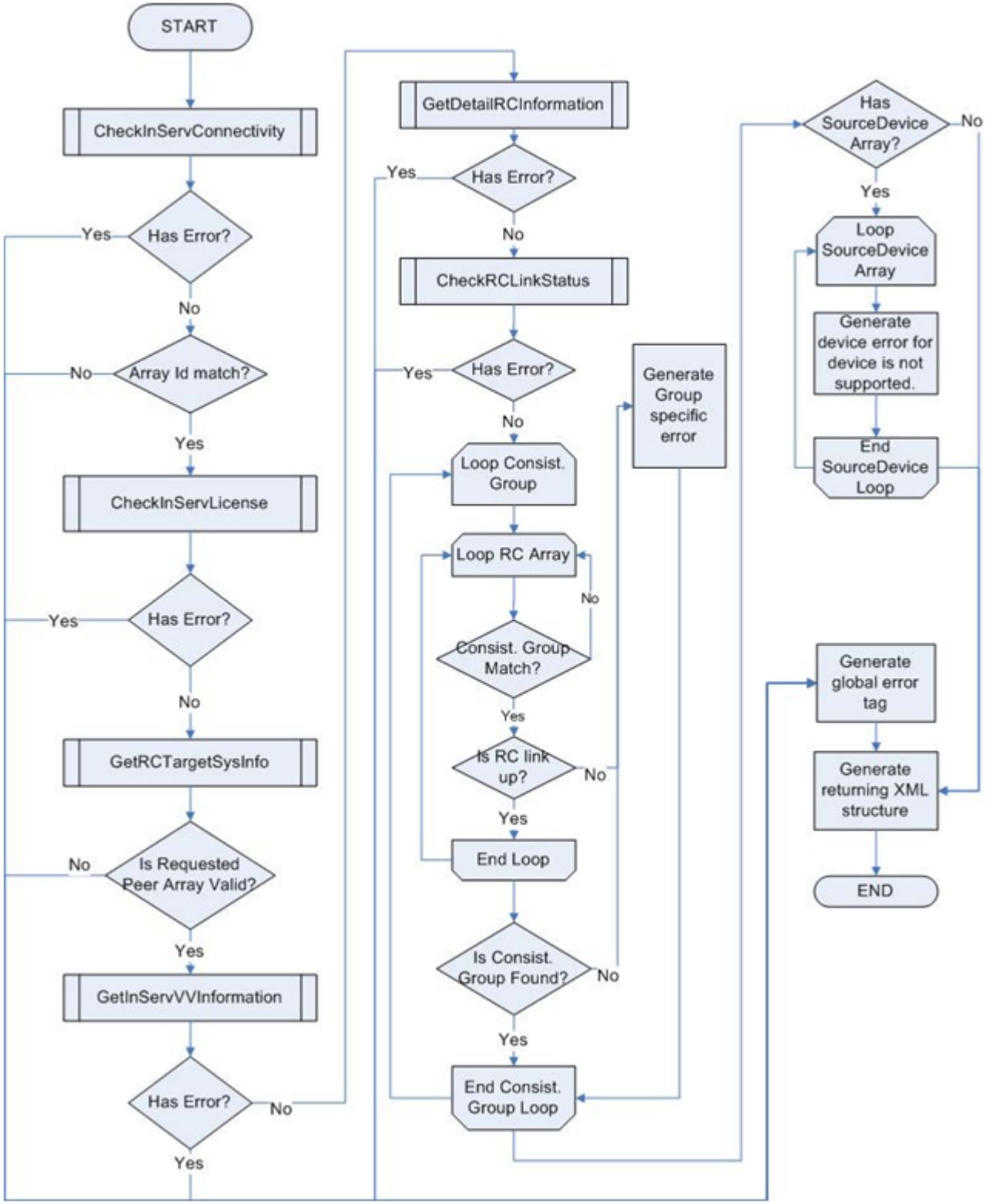
Table 14 prepareReverseReplication Troubleshooting Checklist

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check log file path.	Missing log file path information in the input XML.	[2010-05-26 14:29:32.966 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2014 warning (id=1052)] Warning. Unable to access the specified log folder. The log file will be available at the following location: <C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\3PARInServ>.	This error means that the input XML file does not contain log file path and the logs generated with this command will be saved to the folder indicated.
Load default resource dll.	Missing the resource file.	[2010-05-26 18:00:07.531 'SetLogFolder' 3PAR_1001 info (id=6132)] Could not find any resources appropriate for the specified culture or the neutral culture. Make sure "TPDSrm.MessageString.resources" was correctly embedded or linked into assembly "TPDSrm" at compile time, or that all the satellite assemblies required are loadable and fully signed.	This error means that the default `TPDSrm.resources.dll` file is missing from installation. Reinstall the package to repair the file.
Check HP 3PAR Storage System connectivity.	Connection error	[2010-05-27 10:33:40.062 'arrayMgm.CheckInServConnectivity' 3PAR_1007 error (id=4056)] Error. Unable to get system information. Additional information: login failed - Invalid user or password.	This error indicates that the user name or password is invalid.
Check HP 3PAR Storage System ID.	The requested array ID does not match connected storage array.	[2010-05-27 16:59:32.796 'TPDSrm.discoverDevices.Run' 3PAR_1012 error (id=4616)] Error. Array id <347> does not match the connected HP 3PAR Storage System.	This error indicates that the connected storage array has a different system id than the requested input.
Check HP 3PAR Storage System license.	Missing required license on system.	[2010-05-27 11:36:25.156 'TPDSrm.arrayMgm.CheckInServLicense' 3PAR_1014 error (id=4180)] Error. Missing required <Virtual Copy> license on the connected HP 3PAR Storage System.	This error indicates that required license is missing. HP 3PAR SRA requires the HP 3PAR Storage System to have both Remote Copy Software and Virtual Copy Software licenses.
Get Remote Copy target system information.	Unable to validate the requested peer array ID as one of the target system for Remote Copy.	[2010-05-27 14:14:40.031 'TPDSrm. prepareReverseReplication.Run' 3PAR_1013 error (id=1408)] Error. Peer array id <4145> is not a valid entry in the connected 3PAR Storage Server.	This error indicates that the requested peer array is not a valid target system for HP 3PAR Remote Copy setup. Check the Remote Copy configuration on the

Table 14 prepareReverseReplication Troubleshooting Checklist *(continued)*

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
			storage array for more information.
Get Virtual Volume information on the HP 3PAR Storage System	Missing expected output content from storage.	[2010-05-27 10:58:47.031 'TPDSrm.checkTestFailoverStart.Run' 3PAR_1018 error (id=5432)] Error. Unable to get detail virtual volume information. Additional information: <xxxx>	This error indicates that storage array returns empty output for the command issued. This can be caused by intermittent network interruption.
Check Remote Copy group status.	Invalid Remote Copy group.	[2010-05-27 16:33:37.734 'TPDSrm.testFailoverStart.Run' 3PAR_1022 error (id=1580)] Error. The specified group <MmmtGroup1.r26> does not exist in the storage array.	This error indicates that the requested group for checking is not available in the storage array. Contact your storage administrator and validate the finding.
Check Remote Copy link status.	Remote Copy link is not up.	[2010-05-28 16:44:10.875 'TPDSrm.prepareReverseReplication.Run' 3PAR_1063 error (id=1324)] Error. All available Remote Copy links are down for <srm_cancun.r418>.	This error indicates that Remote Copy link is down between the local storage array and the peer array.

Workflow chart



reverseReplication

The reverseReplication command initiates the replication in reverse. After this command, the TargetGroup becomes the ConsistencyGroup and the ConsistencyGroup becomes the TargetGroup.

This command is executed at the replication source.

SRM expects the HP 3PAR SRA to perform the following:

- The response from reverseReplication must contain the same set of standalone devices (not supported by HP 3PAR SRA) and consistency groups as specified in the request
- The implementation of this command must be non-disruptive to production services running at the recovery site

Troubleshooting checklist

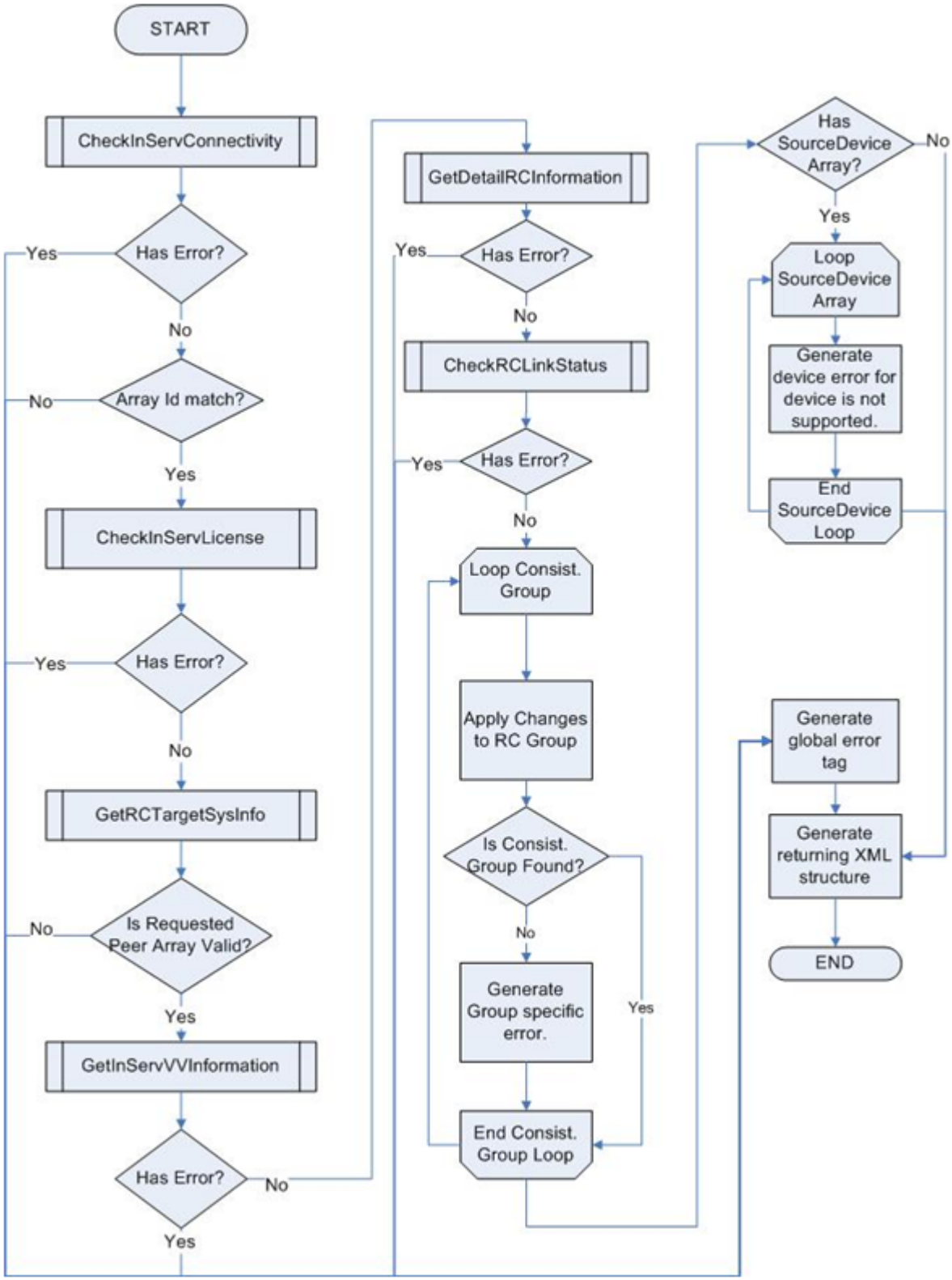
Table 15 reverseReplication Troubleshooting Checklist

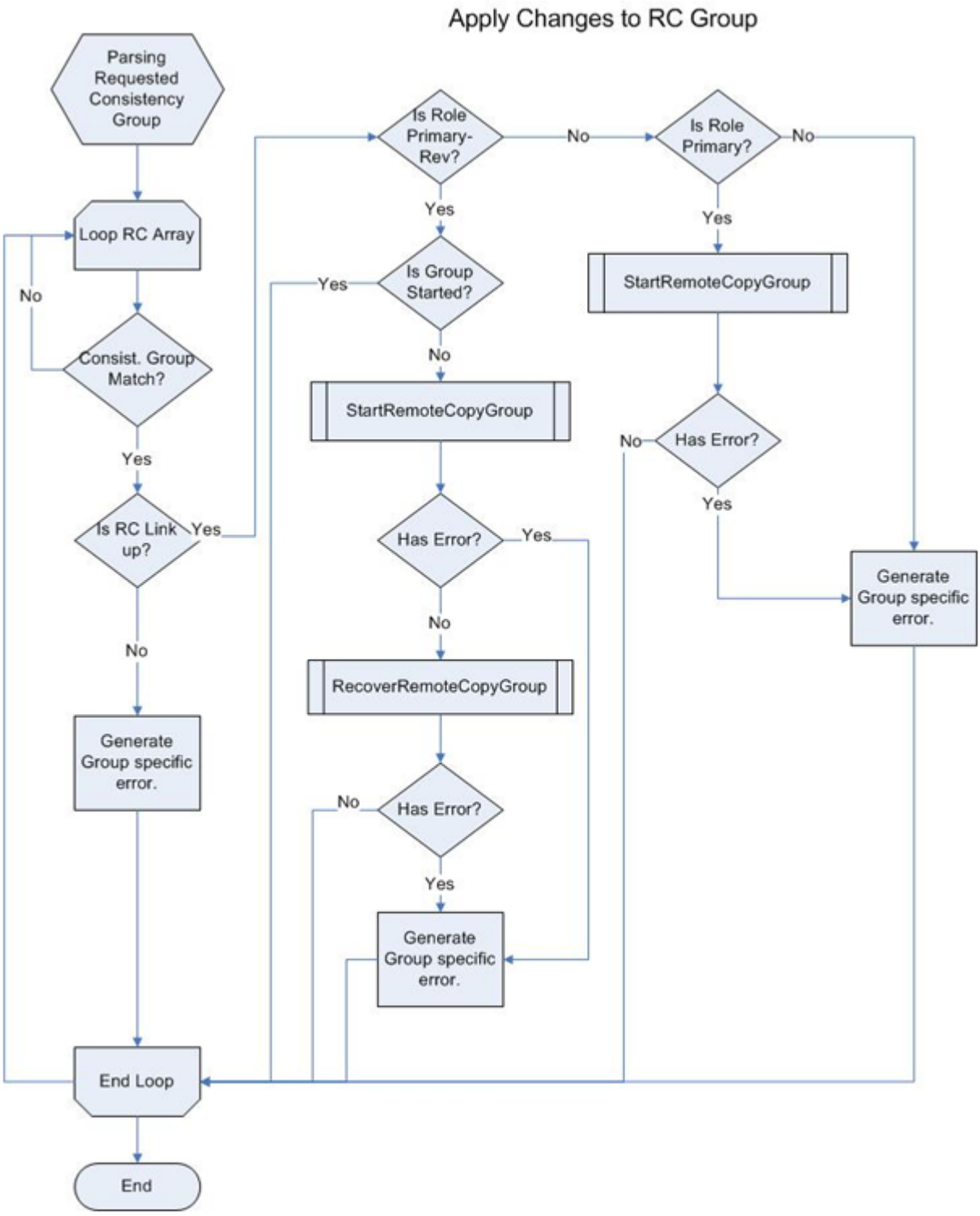
Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check log file path.	Missing log file path information in the input XML.	[2010-05-26 14:29:32.966 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2014 warning (id=1052)] Warning. Unable to access the specified log folder. The log file will be available at the following location: <C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\3PARInServ>.	This error means that the input XML file does not contain log file path and the logs generated with this command will be saved to the folder indicated.
Load default resource dll.	Missing the resource file.	[2010-05-26 18:00:07.531 'SetLogFolder' 3PAR_1001 info (id=6132)] Could not find any resources appropriate for the specified culture or the neutral culture. Make sure "TPDSrm.MessageString.resources" was correctly embedded or linked into assembly "TPDSrm" at compile time, or that all the satellite assemblies required are loadable and fully signed.	This error means that the default `TPDSrm.resources.dll` file is missing from installation. Reinstall the package to repair the file.
Check HP 3PAR Storage System connectivity.	Connection error	[2010-05-27 10:33:40.062 'arrayMgm.CheckInServConnectivity' 3PAR_1007 error (id=4056)] Error. Unable to get system information. Additional information: login failed - Invalid user or password.	This error indicates that the user name or password is invalid.
Check HP 3PAR Storage System ID.	The requested array ID does not match connected storage array.	[2010-05-27 16:59:32.796 'TPDSrm.discoverDevices.Run' 3PAR_1012 error (id=4616)] Error. Array id <347> does not match the connected HP 3PAR Storage System.	This error indicates that the connected storage array has a different system id than the requested input.
Check HP 3PAR Storage System license.	Missing required license on system.	[2010-05-27 11:36:25.156 'TPDSrm.arrayMgm.CheckInServLicense' 3PAR_1014 error (id=4180)] Error. Missing required <Virtual Copy> license on the connected HP 3PAR Storage System.	This error indicates that required license is missing. HP 3PAR SRA requires the HP 3PAR Storage System to have both Remote Copy Software and Virtual Copy Software licenses.
Get Remote Copy target system information.	Unable to validate the requested peer array ID as one of the target system for Remote Copy.	[2010-05-27 14:14:40.031 'TPDSrm. prepareReverseReplication.Run' 3PAR_1013 error (id=1408)] Error. Peer array id <4145> is not a valid entry in the connected 3PAR Storage Server.	This error indicates that the requested peer array is not a valid target system for HP 3PAR Remote Copy setup. Check the Remote Copy configuration on the storage array for more information.

Table 15 reverseReplication Troubleshooting Checklist *(continued)*

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Get Virtual Volume information on the HP 3PAR Storage System	Missing expected output content from storage.	[2010-05-27 10:58:47.031 'TPDSrm. checkTestFailoverStart.Run' 3PAR_1018 error (id=5432)] Error. Unable to get detail virtual volume information. Additional information: <xxxx>	This error indicates that storage array returns empty output for the command issued. This can be caused by intermittent network interruption.
Check Remote Copy group status.	Invalid Remote Copy group.	[2010-05-27 16:33:37.734 'TPDSrm. testFailoverStart.Run' 3PAR_1022 error (id=1580)] Error. The specified group <MmmtGroup1.r26> does not exist in the storage array.	This error indicates that the requested group for checking is not available in the storage array. Contact your storage administrator and validate the finding.
Check Remote Copy link status.	Remote Copy link is not up.	[2010-05-28 16:44:10.875 'TPDSrm.prepareReverseReplication.Run' 3PAR_1063 error (id=1324)] Error. All available Remote Copy links are down for <srm_cancun.r418>.	This error indicates that Remote Copy link is down between the local storage array and the peer array.

Workflow chart




Apply Changes to RC Group
Parsing Requested Consistency Group
Loop RC Array
Consist. Group Match?
No
Yes
Is RC Link up?
Yes
No
Generate Group specific error.
End Loop
End
Is Role Primary-Rev?
No
Yes
Is Group Started?
Yes
No
StartRemoteCopyGroup
Has Error?
Yes
No
RecoverRemoteCopyGroup
Has Error?
No
Yes
Generate Group specific error.
Is Role Primary?
No
Yes
StartRemoteCopyGroup
No
Has Error?
Yes
Generate Group specific error.

prepareRestoreReplication

The prepareRestoreReplication command is issued at the recovery site before restoreReplication to prepare for upcoming restore process. This is meant to be used for restoration after a disruptive failover test.

SRM expects the HP 3PAR SRA to perform the following:

- The response from prepareRestoreReplication must contain the same set of standalone devices (not supported by HP 3PAR SRA) and consistency groups as specified in the request.
- Make sure the site is ready to discard changes.

Troubleshooting checklist

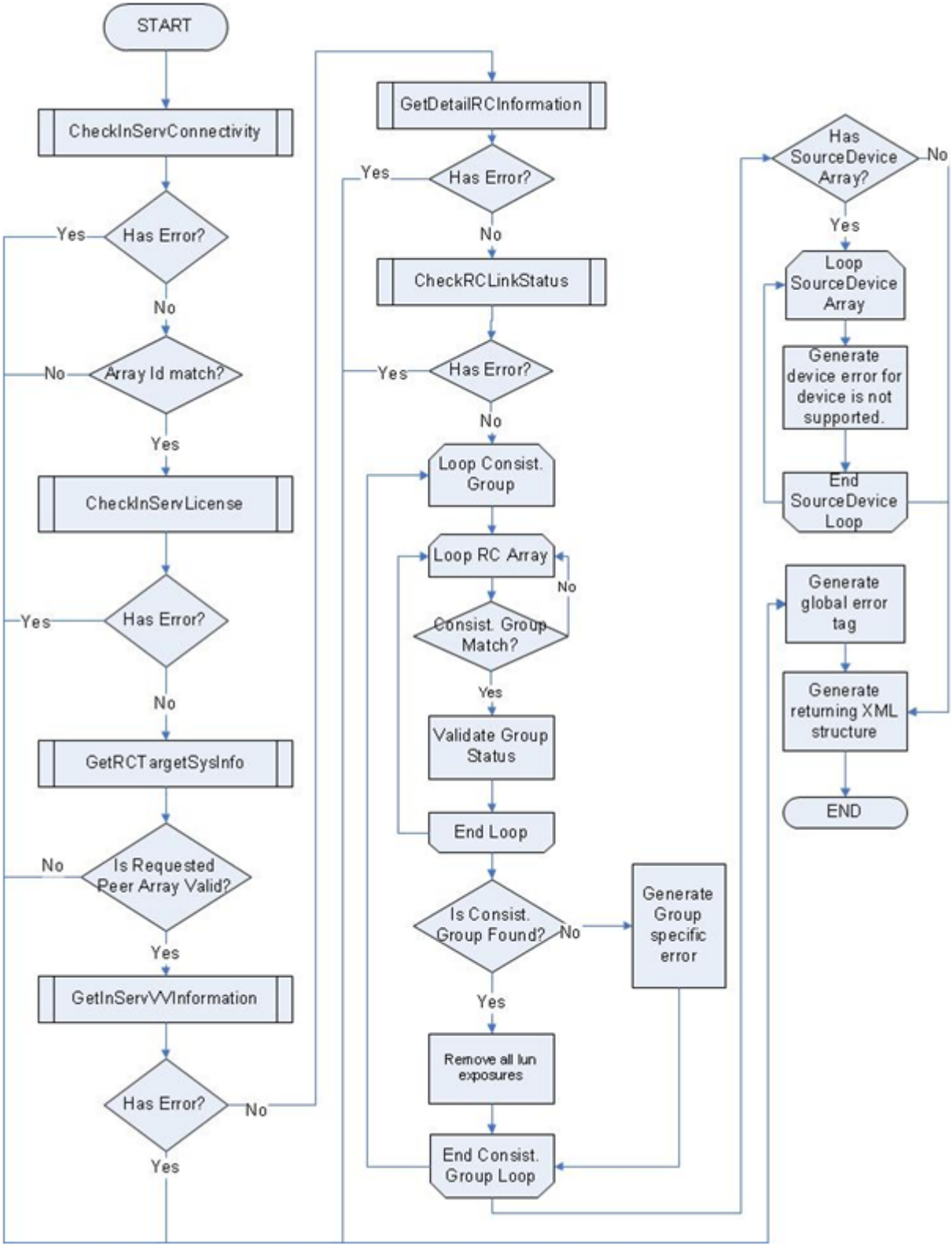
Table 16 prepareRestoreReplication Troubleshooting Checklist

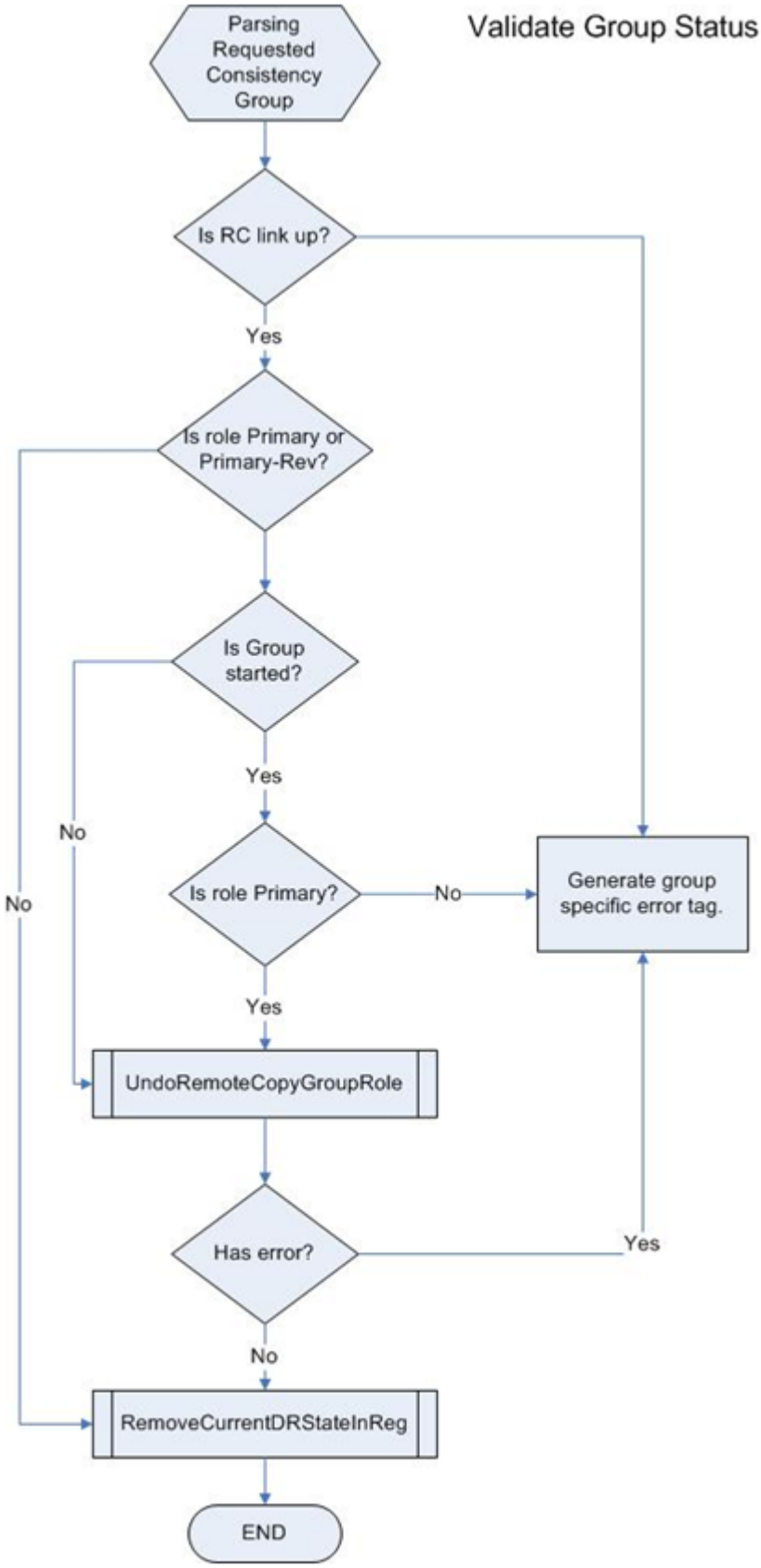
Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check log file path.	Missing log file path information in the input XML.	[2010-05-26 14:29:32.966 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2014 warning (id=1052)] Warning. Unable to access the specified log folder. The log file will be available at the following location: <C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\3PARInServ>.	This error means that the input XML file does not contain log file path and the logs generated with this command will be saved to the folder indicated.
Load default resource dll.	Missing the resource file.	[2010-05-26 18:00:07.531 'SetLogFolder' 3PAR_1001 info (id=6132)] Could not find any resources appropriate for the specified culture or the neutral culture. Make sure "TPDSrm.MessageString.resources" was correctly embedded or linked into assembly "TPDSrm" at compile time, or that all the satellite assemblies required are loadable and fully signed.	This error means that the default `TPDSrm.resources.dll` file is missing from installation. Reinstall the package to repair the file.
Check HP 3PAR Storage System connectivity.	Connection error	[2010-05-27 10:33:40.062 'arrayMgm.CheckInServConnectivity' 3PAR_1007 error (id=4056)] Error. Unable to get system information. Additional information: login failed - Invalid user or password.	This error indicates that the user name or password is invalid.
Check HP 3PAR Storage System ID.	The requested array ID does not match connected storage array.	[2010-05-27 16:59:32.796 'TPDSrm.discoverDevices.Run' 3PAR_1012 error (id=4616)] Error. Array id <347> does not match the connected HP 3PAR Storage System.	This error indicates that the connected storage array has a different system id than the requested input.
Check HP 3PAR Storage System license.	Missing required license on system.	[2010-05-27 11:36:25.156 'TPDSrm.arrayMgm.CheckInServLicense' 3PAR_1014 error (id=4180)] Error. Missing required <Virtual Copy> license on the connected HP 3PAR Storage System.	This error indicates that required license is missing. HP 3PAR SRA requires the HP 3PAR Storage System to have both Remote Copy Software and Virtual Copy Software licenses.
Get Remote Copy target system information.	Unable to validate the requested peer array ID as one of the target system for Remote Copy.	[2010-05-27 14:14:40.031 'TPDSrm. prepareReverseReplication.Run' 3PAR_1013 error (id=1408)] Error. Peer array id <4145> is not a valid entry in the connected 3PAR Storage Server.	This error indicates that the requested peer array is not a valid target system for HP 3PAR Remote Copy setup. Check the Remote Copy configuration on the storage array for more information.

Table 16 prepareRestoreReplication Troubleshooting Checklist *(continued)*

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Get Virtual Volume information on the HP 3PAR Storage System	Missing expected output content from storage.	[2010-05-27 10:58:47.031 'TPDSrm.checkTestFailoverStart.Run' 3PAR_1018 error (id=5432)] Error. Unable to get detail virtual volume information. Additional information: <xxxx>	This error indicates that storage array returns empty output for the command issued. This can be caused by intermittent network interruption.
Check Remote Copy group status.	Invalid Remote Copy group.	[2010-05-27 16:33:37.734 'TPDSrm.testFailoverStart.Run' 3PAR_1022 error (id=1580)] Error. The specified group <MmmtGroup1.r26> does not exist in the storage array.	This error indicates that the requested group for checking is not available in the storage array. Contact your storage administrator and validate the finding.
	Remote Copy group is not started.	[2010-05-27 17:44:41.375 'TPDSrm.prepareRestoreReplication.Run' 3PAR_1076 error (id=5636)] . Error. Data on target site might be corrupted for Remote Copy Group <MmmtGroup1.r256>. Unable to continue the restore operation.	This error indicates that the Remote Copy group is not started. This can be an indication that something has gone wrong and it requires administrator to validate the data integrity and setup.
Check Remote Copy link status.	Remote Copy link is not up.	[2010-05-28 16:44:10.875 'TPDSrm.prepareReverseReplication.Run' 3PAR_1063 error (id=1324)] Error. All available Remote Copy links are down for <srm_cancun.r418>.	This error indicates that Remote Copy link is down between the local storage array and the peer array.

Workflow chart




Validate Group Status
Parsing Requested Consistency Group
Is RC link up?
Yes
Is role Primary or Primary-Rev?
Is Group started?
Yes
No
Is role Primary?
No
Generate group specific error tag.
No
Yes
UndoRemoteCopyGroupRole
Has error?
Yes
No
RemoveCurrentDRStateInReg
END

restoreReplication

The restoreReplication command is issued at the protected site after prepareRestoreReplication, and it discards any changes made to failover devices and makes the protected site the primary site again. This is meant to be used for restoration after a disruptive failover test. Another use case for this operation is if failover fails, users can use restore replication to ensure that the original protected site is writable for normal operation.

SRM expects the HP 3PAR SRA to perform the following:

- The response from restoreReplication must contain the same set of standalone devices (not supported by HP 3PAR SRA) and consistency groups as specified in the request
- Discard any changes made after failover

Troubleshooting checklist

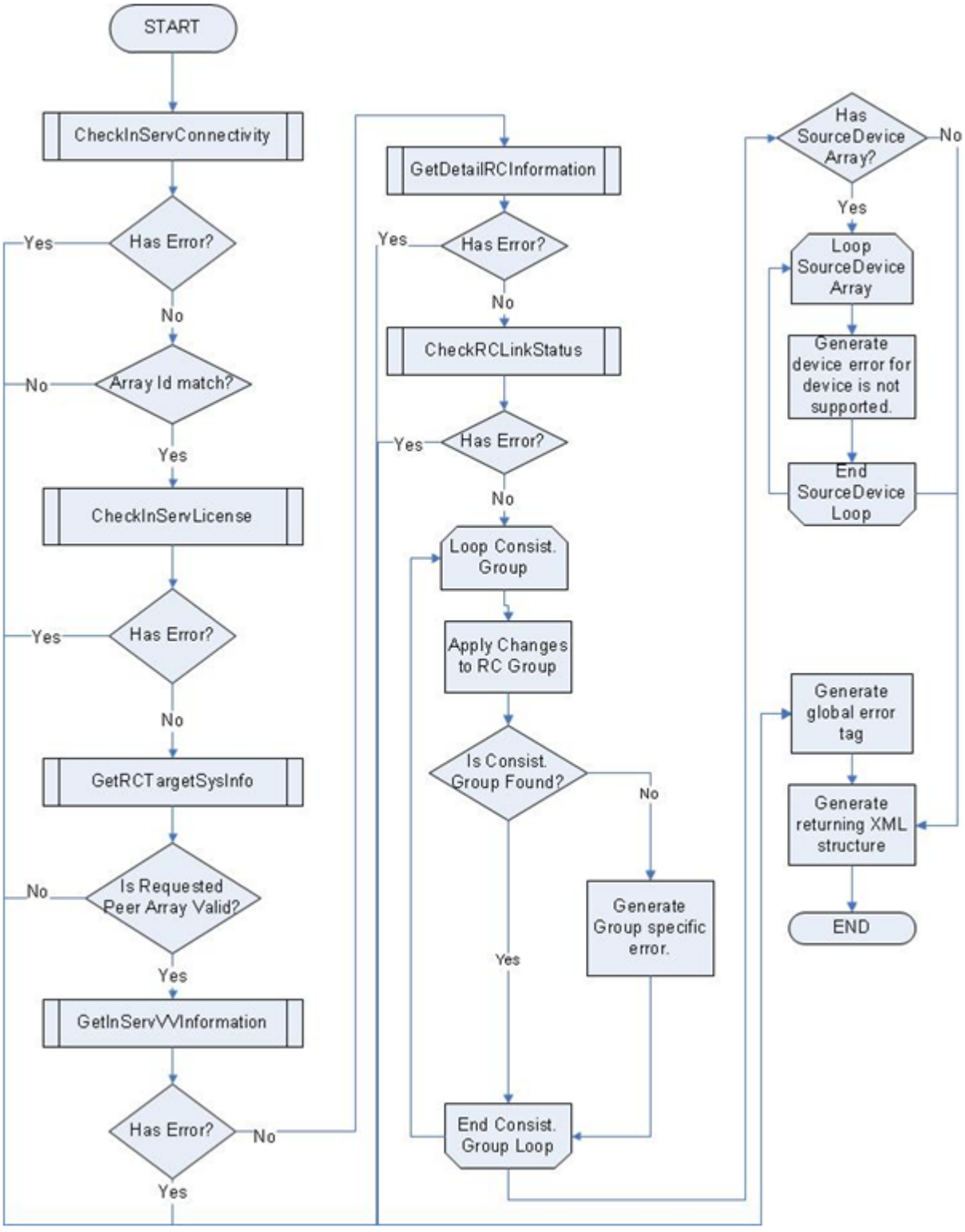
Table 17 restoreReplication Troubleshooting Checklist

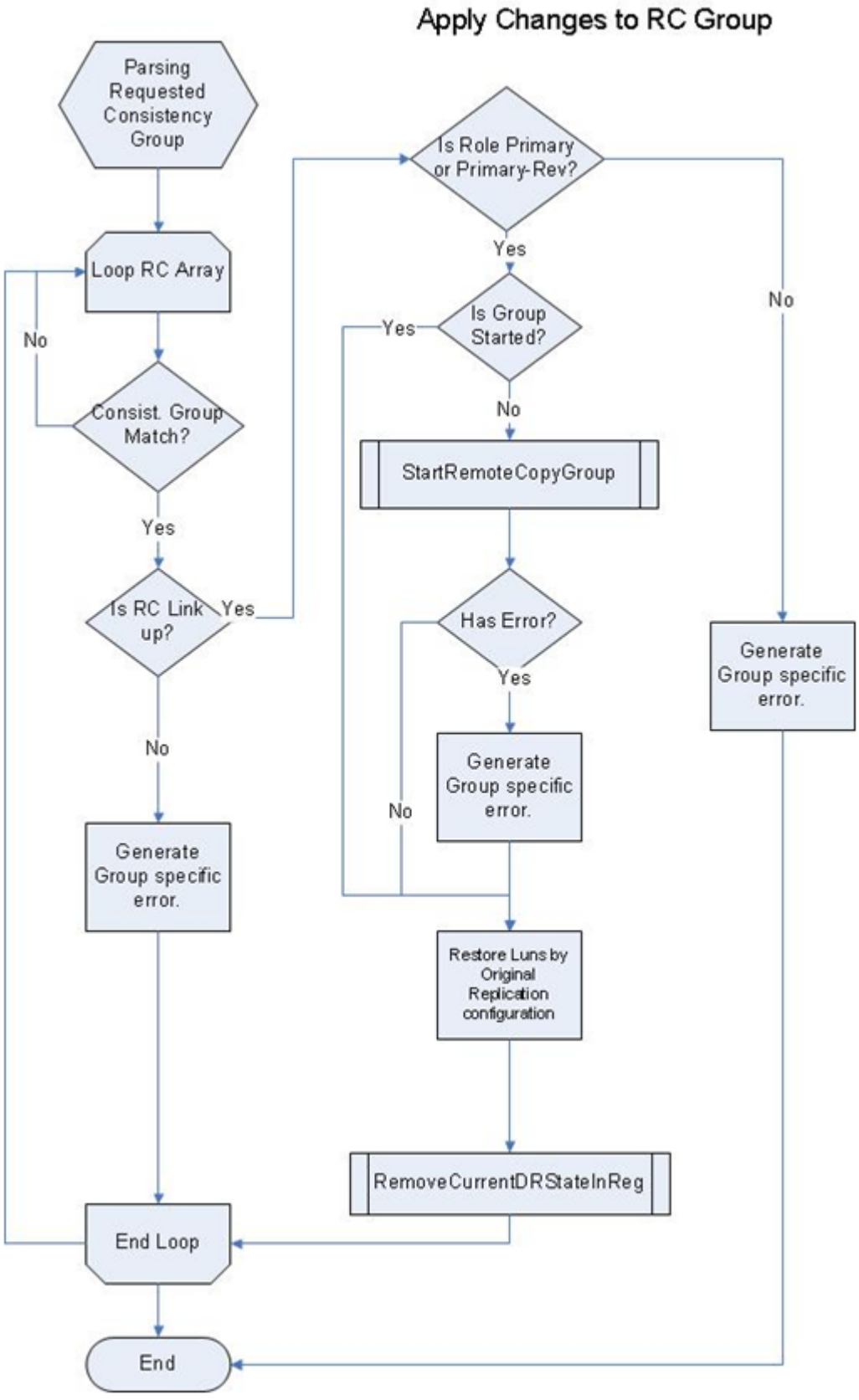
Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check log file path.	Missing log file path information in the input XML.	[2010-05-26 14:29:32.966 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2014 warning (id=1052)] Warning. Unable to access the specified log folder. The log file will be available at the following location: <C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\3PARInServ>.	This error means that the input XML file does not contain log file path and the logs generated with this command will be saved to the folder indicated.
Load default resource dll.	Missing the resource file.	[2010-05-26 18:00:07.531 'SetLogFolder' 3PAR_1001 info (id=6132)] Could not find any resources appropriate for the specified culture or the neutral culture. Make sure "TPDSrm.MessageString.resources" was correctly embedded or linked into assembly "TPDSrm" at compile time, or that all the satellite assemblies required are loadable and fully signed.	This error means that the default `TPDSrm.resources.dll` file is missing from installation. Reinstall the package to repair the file.
Check HP 3PAR Storage System connectivity.	Connection error	[2010-05-27 10:33:40.062 'arrayMgm.CheckInServConnectivity' 3PAR_1007 error (id=4056)] Error. Unable to get system information. Additional information: login failed - Invalid user or password.	This error indicates that the user name or password is invalid.
Check HP 3PAR Storage System ID.	The requested array ID does not match connected storage array.	[2010-05-27 16:59:32.796 'TPDSrm.discoverDevices.Run' 3PAR_1012 error (id=4616)] Error. Array id <347> does not match the connected HP 3PAR Storage System.	This error indicates that the connected storage array has a different system id than the requested input.
Check HP 3PAR Storage System license.	Missing required license on system.	[2010-05-27 11:36:25.156 'TPDSrm.arrayMgm.CheckInServLicense' 3PAR_1014 error (id=4180)] Error. Missing required <Virtual Copy> license on the connected HP 3PAR Storage System.	This error indicates that required license is missing. HP 3PAR SRA requires the HP 3PAR Storage System to have both Remote Copy Software and Virtual Copy Software licenses.
Get Remote Copy target system information.	Unable to validate the requested peer array ID as one of the target system for Remote Copy.	[2010-05-27 14:14:40.031 'TPDSrm. prepareReverseReplication.Run' 3PAR_1013 error (id=1408)] Error. Peer array id <4145> is not a valid entry in the connected 3PAR Storage Server.	This error indicates that the requested peer array is not a valid target system for HP 3PAR Remote Copy setup. Check the Remote Copy configuration on the

Table 17 restoreReplication Troubleshooting Checklist *(continued)*

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
			storage array for more information.
Get Virtual Volume information on the HP 3PAR Storage System	Missing expected output content from storage.	[2010-05-27 10:58:47.031 'TPDSrm.checkTestFailoverStart.Run' 3PAR_1018 error (id=5432)] Error. Unable to get detail virtual volume information. Additional information: <xxxx>	This error indicates that storage array returns empty output for the command issued. This can be caused by intermittent network interruption.
Check Remote Copy group status.	Invalid Remote Copy group.	[2010-05-27 16:33:37.734 'TPDSrm.testFailoverStart.Run' 3PAR_1022 error (id=1580)] Error. The specified group <MmmtGroup1.r26> does not exist in the storage array.	This error indicates that the requested group for checking is not available in the storage array. Contact your storage administrator and validate the finding.
	Invalid Remote Copy group status.	[2010-05-28 17:49:48.625 'TPDSrm.restoreReplication.Run' 3PAR_1068 error (id=4500)] Error. Remote Group <srm_cancun.r418> is not a Primary Group in the HP 3PAR Storage System.	This error indicates that the specified Remote Copy group is not in the expected role. Restore operation requires Remote Copy group to be in Primary or Primary-Rev role.
Start Remote Copy group	Remote Copy group cannot be started.	[2010-05-28 17:34:13.343 'TPDSrm.arrayMgm.StartRemoteCopyGroup' 3PAR_1059 error (id=2784)] Error. Unable to start the specified Remote Copy Group. Additional information: Could not be started on target RC_S418_SYNC. Attempt to start group srm_cancun.r418 failed: Secondary group for group srm_cancun.r418 on target system RC_S418_SYNC does not match primary group.	This error indicates that the requested Remote Copy group cannot be started. This operation is required if the group role is in Primary or Primary-Rev. Check the Remote Copy configuration for the reason of failure.
Check Remote Copy link status.	Remote Copy link is not up.	[2010-05-28 16:44:10.875 'TPDSrm.prepareReverseReplication.Run' 3PAR_1063 error (id=1324)] Error. All available Remote Copy links are down for <srm_cancun.r418>.	This error indicates that Remote Copy link is down between the local storage array and the peer array.

Workflow chart




Apply Changes to RC Group
Parsing Requested Consistency Group
Loop RC Array
Consist. Group Match?
No
Yes
Is RC Link up?
Yes
No
Generate Group specific error.
Is Role Primary or Primary-Rev?
Yes
No
Is Group Started?
Yes
No
StartRemoteCopyGroup
Has Error?
Yes
No
Generate Group specific error.
Restore Luns by Original Replication configuration
RemoveCurrentDRStateInReg
Generate Group specific error.
End Loop
End

syncOnce

The syncOnce command initiates the immediate replication of the specified devices and consistency groups. syncOnce must return as soon as possible without waiting for replication to complete. After executing syncOnce, SRM executes periodic querySyncStatus commands to check replication progress.

HP 3PAR SRA is using the push model in this case where replication is initiated at the source. The replication operation status is returned to the caller via an XML file.

Troubleshooting checklist

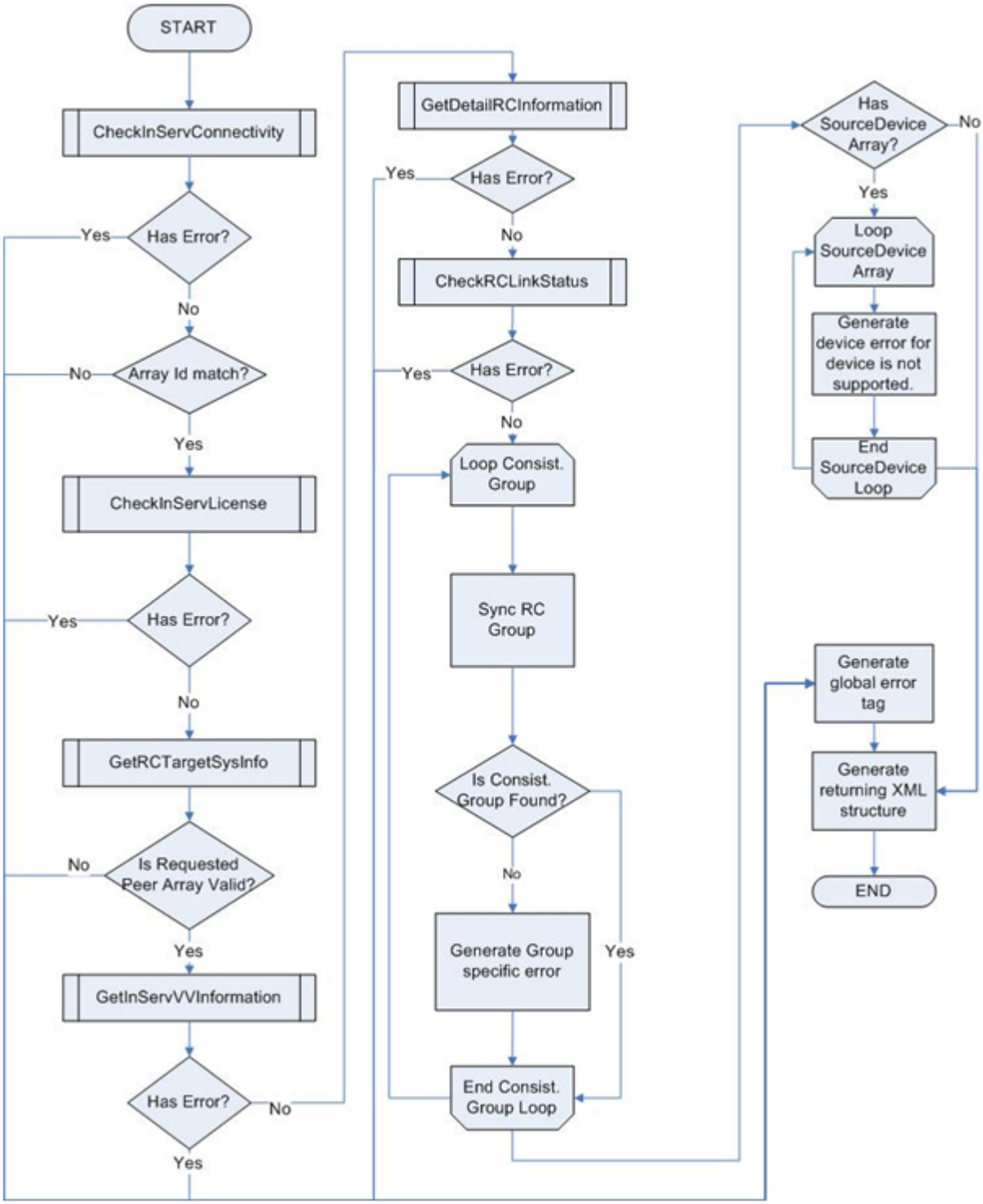
Table 18 syncOnce Troubleshooting Checklist

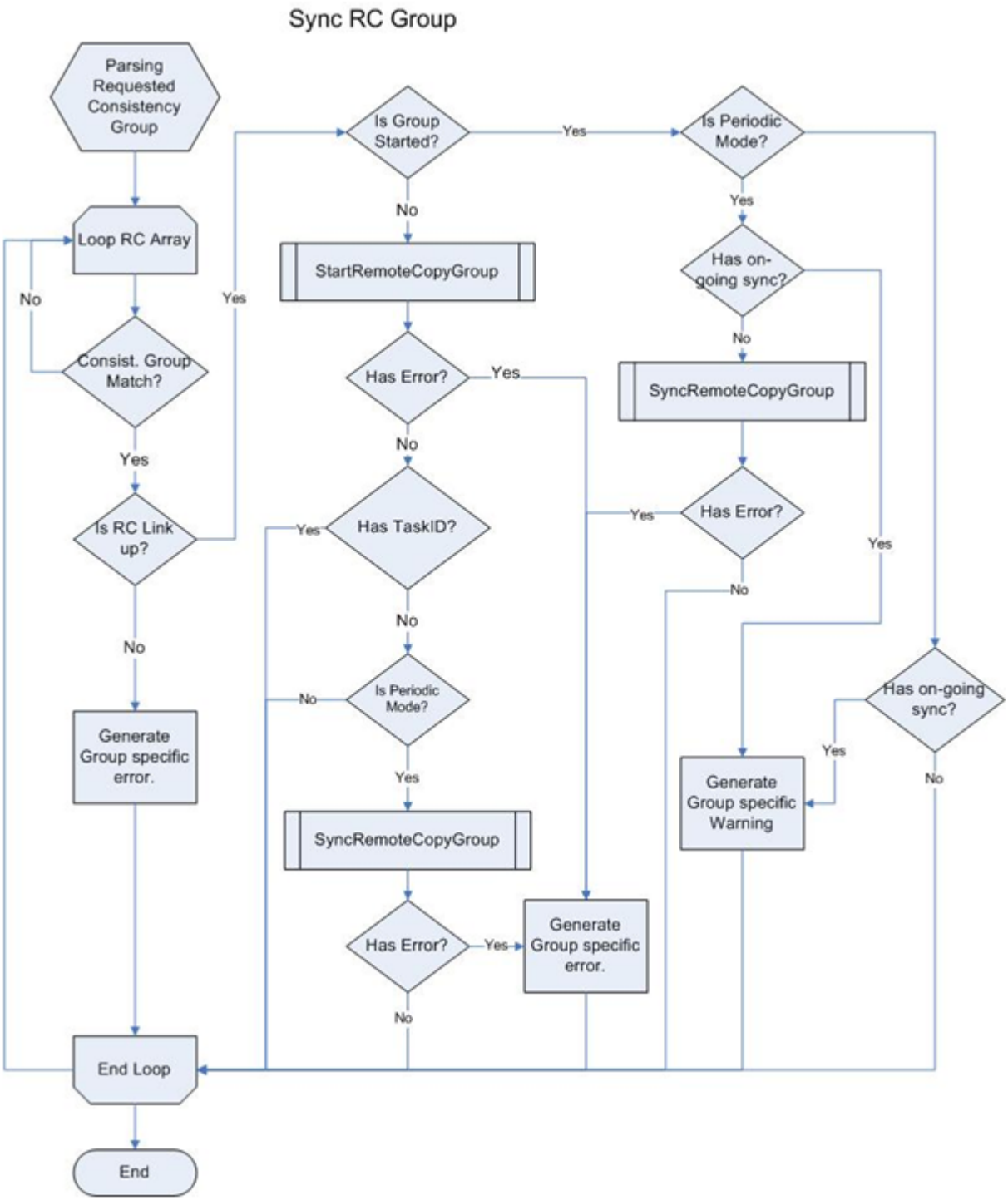
Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check log file path.	Missing log file path information in the input XML.	[2010-05-26 14:29:32.966 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2014 warning (id=1052)] Warning. Unable to access the specified log folder. The log file will be available at the following location: <C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\3PARInServ>.	This error means that the input XML file does not contain log file path and the logs generated with this command will be saved to the folder indicated.
Load default resource dll.	Missing the resource file.	[2010-05-26 18:00:07.531 'SetLogFolder' 3PAR_1001 info (id=6132)] Could not find any resources appropriate for the specified culture or the neutral culture. Make sure "TPDSrm.MessageString.resources" was correctly embedded or linked into assembly "TPDSrm" at compile time, or that all the satellite assemblies required are loadable and fully signed.	This error means that the default `TPDSrm.resources.dll` file is missing from installation. Reinstall the package to repair the file.
Check HP 3PAR Storage System connectivity.	Connection error	[2010-05-27 10:33:40.062 'arrayMgm.CheckInServConnectivity' 3PAR_1007 error (id=4056)] Error. Unable to get system information. Additional information: login failed - Invalid user or password.	This error indicates that the user name or password is invalid.
Check HP 3PAR Storage System ID.	The requested array ID does not match connected storage array.	[2010-05-27 16:59:32.796 'TPDSrm.discoverDevices.Run' 3PAR_1012 error (id=4616)] Error. Array id <347> does not match the connected HP 3PAR Storage System.	This error indicates that the connected storage array has a different system id than the requested input.
Check HP 3PAR Storage System license.	Missing required license on system.	[2010-05-27 11:36:25.156 'TPDSrm.arrayMgm.CheckInServLicense' 3PAR_1014 error (id=4180)] Error. Missing required <Virtual Copy> license on the connected HP 3PAR Storage System.	This error indicates that required license is missing. HP 3PAR SRA requires the HP 3PAR Storage System to have both Remote Copy Software and Virtual Copy Software licenses.
Get Remote Copy target system information.	Unable to validate the requested peer array ID as one of the target system for Remote Copy.	[2010-05-27 14:14:40.031 'TPDSrm. prepareReverseReplication.Run' 3PAR_1013 error (id=1408)] Error. Peer array id <4145> is not a valid entry in the connected 3PAR Storage Server.	This error indicates that the requested peer array is not a valid target system for HP 3PAR Remote Copy setup. Check the Remote Copy configuration on the storage array for more information.

Table 18 syncOnce Troubleshooting Checklist *(continued)*

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Get Virtual Volume information on the HP 3PAR Storage System	Missing expected output content from storage.	[2010-05-27 10:58:47.031 'TPDSrm. checkTestFailoverStart.Run' 3PAR_1018 error (id=5432)] Error. Unable to get detail virtual volume information. Additional information: <xxxx>	This error indicates that storage array returns empty output for the command issued. This can be caused by intermittent network interruption.
Check Remote Copy group status.	Invalid Remote Copy group.	[2010-05-27 16:33:37.734 'TPDSrm. testFailoverStart.Run' 3PAR_1022 error (id=1580)] Error. The specified group <MmmtGroup1.r26> does not exist in the storage array.	This error indicates that the requested group for checking is not available in the storage array. Contact your storage administrator and validate the finding.
Start Remote Copy group	Remote Copy group cannot be started.	[2010-05-28 17:34:13.343 'TPDSrm.arrayMgm.StartRemoteCopyGroup' 3PAR_1059 error (id=2784)] Error. Unable to start the specified Remote Copy Group. Additional information: Could not be started on target RC_S418_SYNC. Attempt to start group srm_cancun.r418 failed: Secondary group for group srm_cancun.r418 on target system RC_S418_SYNC does not match primary group.	This error indicates that the requested Remote Copy group cannot be started. This operation is required if the group role is in Primary or Primary-Rev. Check the Remote Copy configuration for the reason of failure.
Check Remote Copy link status.	Remote Copy link is not up.	[2010-05-28 16:44:10.875 'TPDSrm.prepareReverseReplication.Run' 3PAR_1063 error (id=1324)] Error. All available Remote Copy links are down for <srm_cancun.r418>.	This error indicates that Remote Copy link is down between the local storage array and the peer array.

Workflow chart




Sync RC Group
Parsing Requested Consistency Group
Loop RC Array
Consist. Group Match?
No
Yes
Is RC Link up?
Yes
No
Generate Group specific error.
End Loop
End
Is Group Started?
Yes
No
StartRemoteCopyGroup
Has Error?
Yes
No
Has TaskID?
Yes
No
Is Periodic Mode?
No
Yes
SyncRemoteCopyGroup
Has Error?
Yes
No
Generate Group specific error.
Is Periodic Mode?
Yes
Yes
Has on-going sync?
No
SyncRemoteCopyGroup
Has Error?
Yes
No
Has on-going sync?
Yes
No
Generate Group specific Warning

querySyncStatus

The querySyncStatus command returns the status of replication sessions initiated with syncOnce command.

The synchronization status of the specified Remote Copy Group for the specified target server is returned to SRM:

Troubleshooting checklist

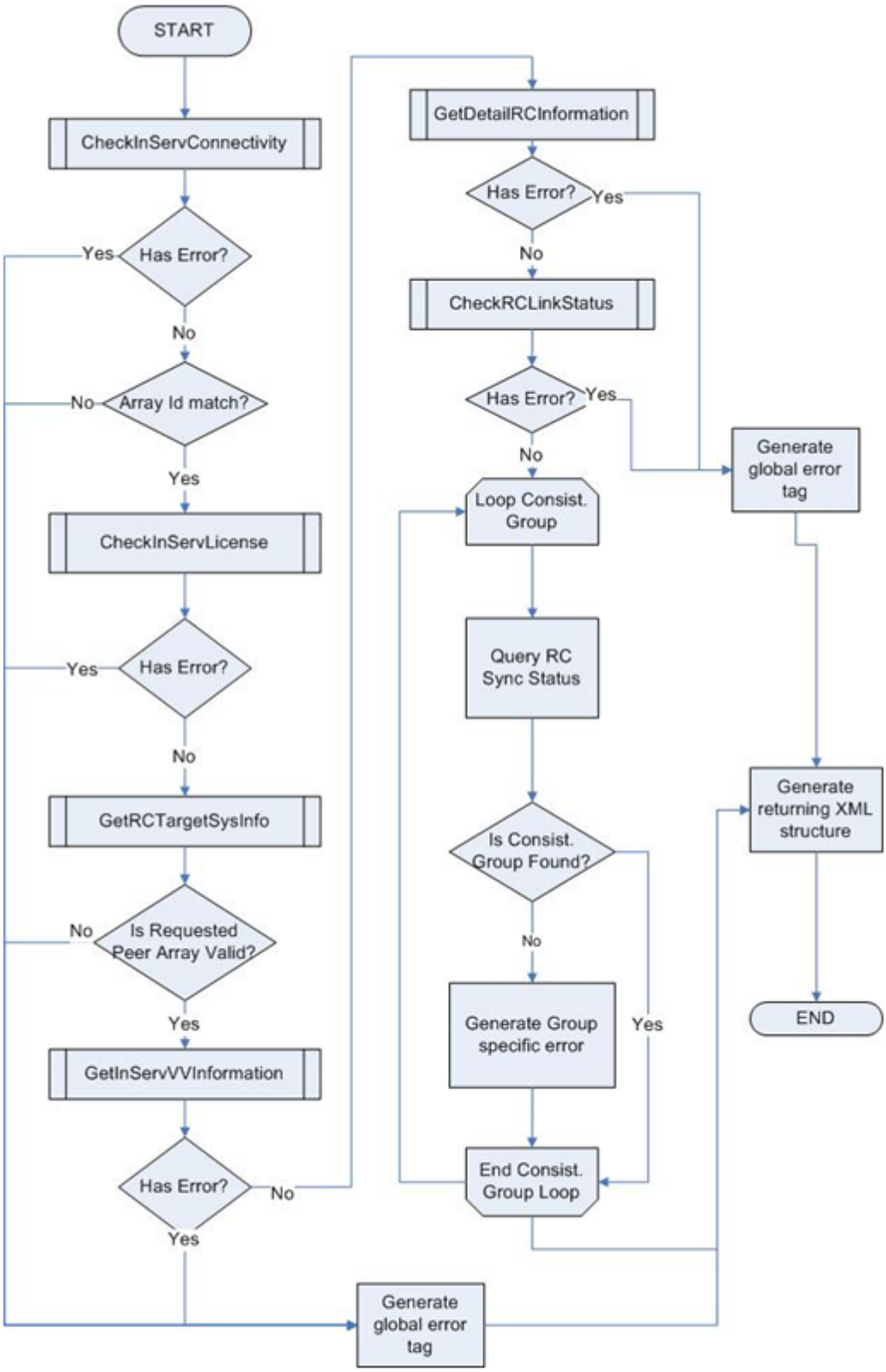
Table 19 querySyncStatus Troubleshooting Checklist

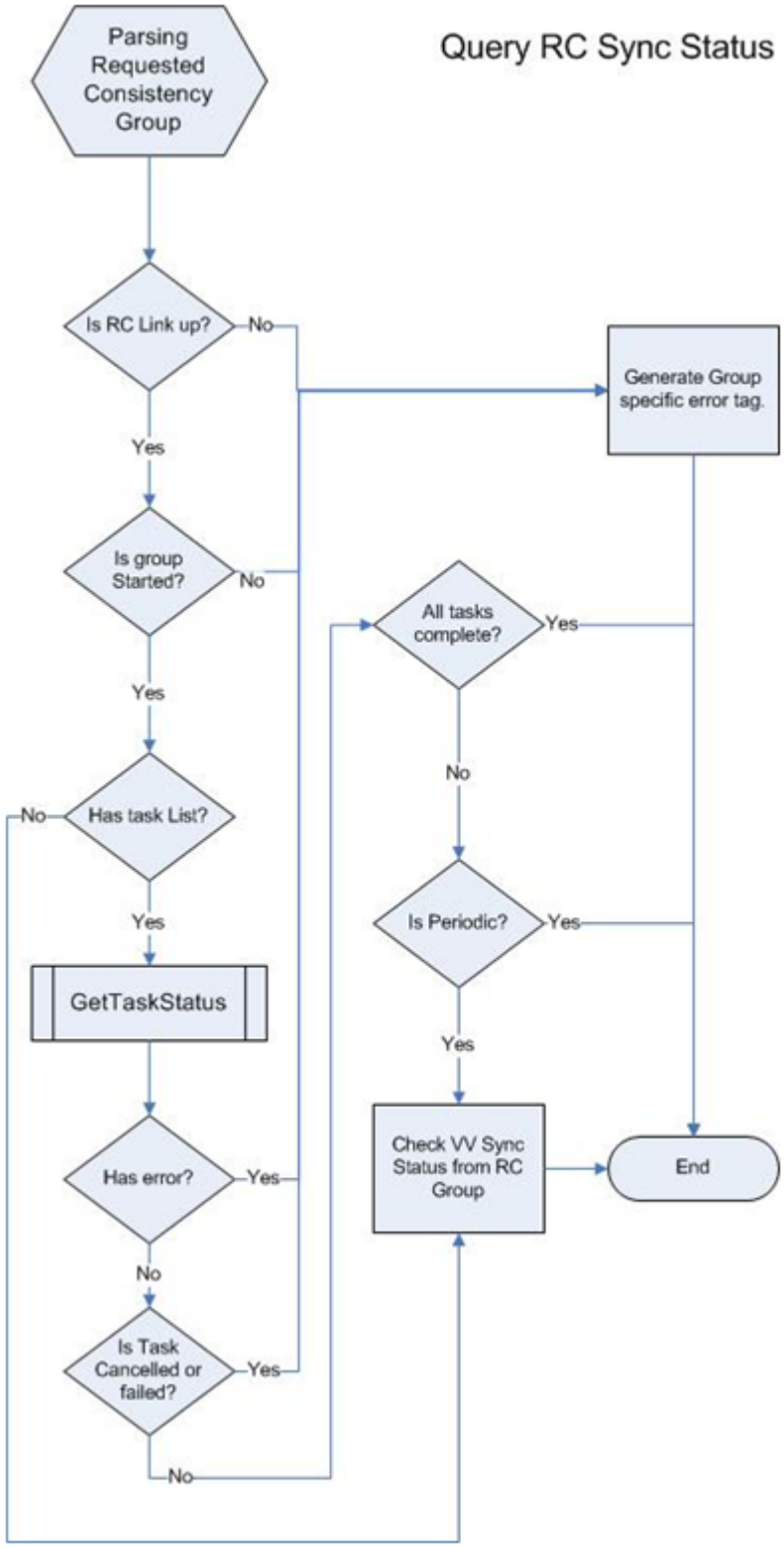
Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check log file path.	Missing log file path information in the input XML.	[2010-05-26 14:29:32.966 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2014 warning (id=1052)] Warning. Unable to access the specified log folder. The log file will be available at the following location: <C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\3PARInServ>.	This error means that the input XML file does not contain log file path and the logs generated with this command will be saved to the folder indicated.
Load default resource dll.	Missing the resource file.	[2010-05-26 18:00:07.531 'SetLogFolder' 3PAR_1001 info (id=6132)] Could not find any resources appropriate for the specified culture or the neutral culture. Make sure "TPDSrm.MessageString.resources" was correctly embedded or linked into assembly "TPDSrm" at compile time, or that all the satellite assemblies required are loadable and fully signed.	This error means that the default `TPDSrm.resources.dll` file is missing from installation. Reinstall the package to repair the file.
Check HP 3PAR Storage System connectivity.	Connection error	[2010-05-27 10:33:40.062 'arrayMgm.CheckInServConnectivity' 3PAR_1007 error (id=4056)] Error. Unable to get system information. Additional information: login failed - Invalid user or password.	This error indicates that the user name or password is invalid.
Check HP 3PAR Storage System ID.	The requested array ID does not match connected storage array.	[2010-05-27 16:59:32.796 'TPDSrm.discoverDevices.Run' 3PAR_1012 error (id=4616)] Error. Array id <347> does not match the connected HP 3PAR Storage System.	This error indicates that the connected storage array has a different system id than the requested input.
Check HP 3PAR Storage System license.	Missing required license on system.	[2010-05-27 11:36:25.156 'TPDSrm.arrayMgm.CheckInServLicense' 3PAR_1014 error (id=4180)] Error. Missing required <Virtual Copy> license on the connected HP 3PAR Storage System.	This error indicates that required license is missing. HP 3PAR SRA requires the HP 3PAR Storage System to have both Remote Copy Software and Virtual Copy Software licenses.
Get Remote Copy target system information.	Unable to validate the requested peer array ID as one of the target system for Remote Copy.	[2010-05-27 14:14:40.031 'TPDSrm. prepareReverseReplication.Run' 3PAR_1013 error (id=1408)] Error. Peer array id <4145> is not a valid entry in the connected 3PAR Storage Server.	This error indicates that the requested peer array is not a valid target system for HP 3PAR Remote Copy setup. Check the Remote Copy configuration on the storage array for more information.
Get Virtual Volume information on the HP 3PAR Storage System	Missing expected output content from storage.	[2010-05-27 10:58:47.031 'TPDSrm. checkTestFailoverStart.Run' 3PAR_1018 error (id=5432)] Error. Unable to get detail virtual	This error indicates that storage array returns empty output for the command issued. This can be caused

Table 19 querySyncStatus Troubleshooting Checklist *(continued)*

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
		volume information. Additional information: <xxxx>	by intermittent network interruption.
Check Remote Copy group status.	Invalid Remote Copy group.	[2010-05-27 16:33:37.734 'TPDSrm. testFailoverStart.Run' 3PAR_1022 error (id=1580)] Error. The specified group <MmmtGroup1.r26> does not exist in the storage array.	This error indicates that the requested group for checking is not available in the storage array. Contact your storage administrator and validate the finding.
	Remote Copy group is not started.	[2010-05-27 16:33:37.734 'TPDSrm. querySyncStatus.Run' 3PAR_1022 error (id=1580)] Error. Remote Copy Group <srm.cancun.r418> is not started.	This error indicates that the monitoring group is not started. Check the Remote Copy configuration on the storage system for more information.
Check Remote Copy link status.	Remote Copy link is not up.	[2010-05-28 16:44:10.875 'TPDSrm.prepareReverseReplication.Run' 3PAR_1063 error (id=1324)] Error. All available Remote Copy links are down for <srm_cancun.r418>.	This error indicates that Remote Copy link is down between the local storage array and the peer array.

Workflow chart




Query RC Sync Status
Parsing Requested Consistency Group
Is RC Link up?
No
Yes
Generate Group specific error tag.
Is group Started?
No
Yes
All tasks complete?
Yes
No
Has task List?
No
Yes
Is Periodic?
Yes
Yes
GetTaskStatus
Check VV Sync Status from RC Group
End
Has error?
Yes
No
Is Task Cancelled or failed?
Yes
No

queryReplicationSettings

This command returns the replication settings, which need to be preserved after failover when replication is reversed or restored. HP 3PAR SRA saves this data, but currently does not make any reference to the data during reverseReplication or restoreReplication.

Troubleshooting checklist

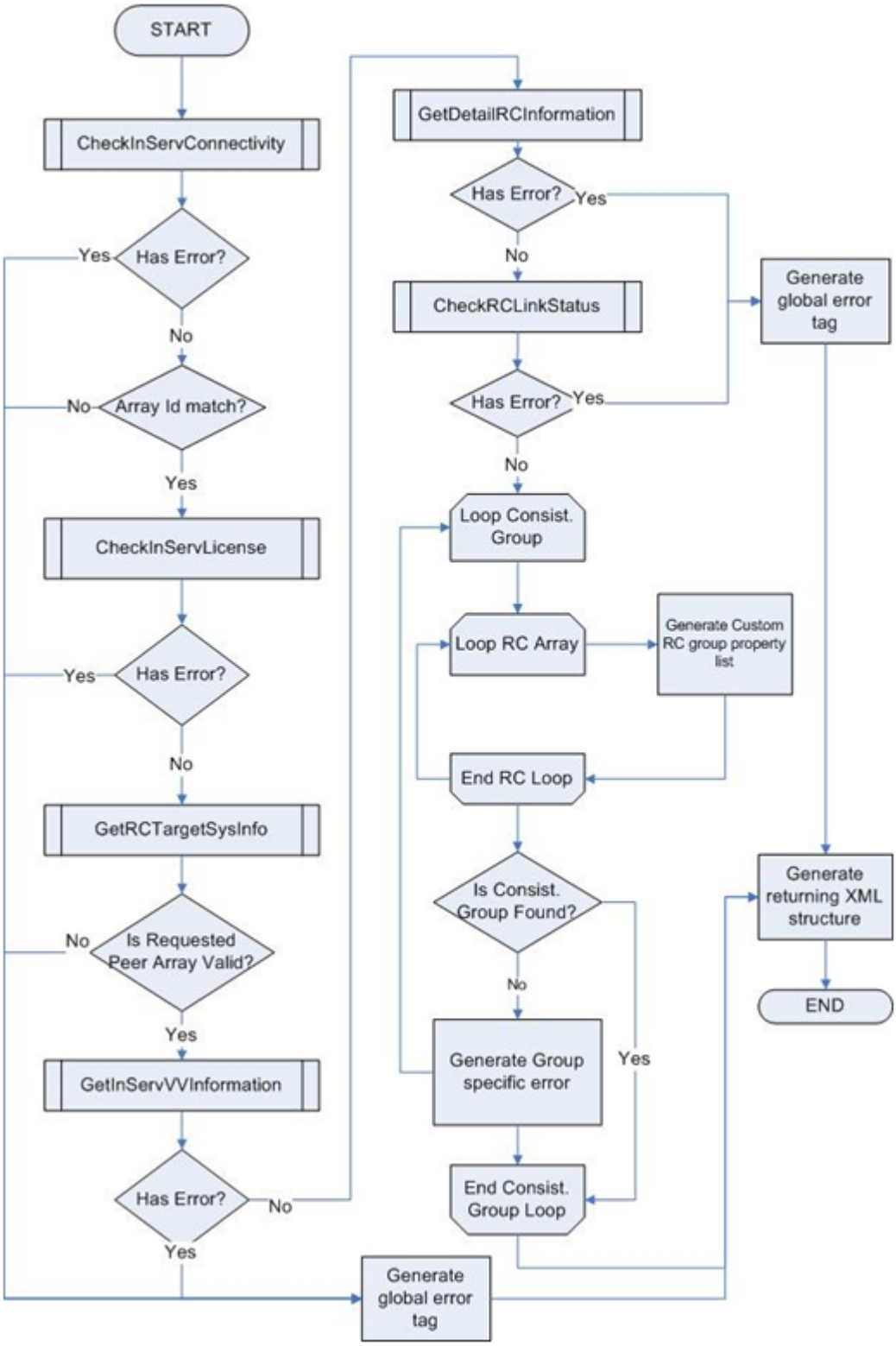
Table 20 queryReplicationSettingsTroubleshooting Checklist

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
Check log file path.	Missing log file path information in the input XML.	[2010-05-26 14:29:32.966 'TPDSrm.arrayMgm.AddGlobalWarning' 3PAR_2014 warning (id=1052)] Warning. Unable to access the specified log folder. The log file will be available at the following location: <C:\Program Files\VMware\VMware vCenter Site Recovery Manager\storage\sra\3PARInServ>.	This error means that the input XML file does not contain log file path and the logs generated with this command will be saved to the folder indicated.
Load default resource dll.	Missing the resource file.	[2010-05-26 18:00:07.531 'SetLogFolder' 3PAR_1001 info (id=6132)] Could not find any resources appropriate for the specified culture or the neutral culture. Make sure "TPDSrm.MessageString.resources" was correctly embedded or linked into assembly "TPDSrm" at compile time, or that all the satellite assemblies required are loadable and fully signed.	This error means that the default `TPDSrm.resources.dll` file is missing from installation. Reinstall the package to repair the file.
Check HP 3PAR Storage System connectivity.	Connection error	[2010-05-27 10:33:40.062 'arrayMgm.CheckInServConnectivity' 3PAR_1007 error (id=4056)] Error. Unable to get system information. Additional information: login failed - Invalid user or password.	This error indicates that the user name or password is invalid.
Check HP 3PAR Storage System ID.	The requested array ID does not match connected storage array.	[2010-05-27 16:59:32.796 'TPDSrm.discoverDevices.Run' 3PAR_1012 error (id=4616)] Error. Array id <347> does not match the connected HP 3PAR Storage System.	This error indicates that the connected storage array has a different system id than the requested input.
Check HP 3PAR Storage System license.	Missing required license on system.	[2010-05-27 11:36:25.156 'TPDSrm.arrayMgm.CheckInServLicense' 3PAR_1014 error (id=4180)] Error. Missing required <Virtual Copy> license on the connected HP 3PAR Storage System.	This error indicates that required license is missing. HP 3PAR SRA requires the HP 3PAR Storage System to have both Remote Copy Software and Virtual Copy Software licenses.
Get Remote Copy target system information.	Unable to validate the requested peer array ID as one of the target system for Remote Copy.	[2010-05-27 14:14:40.031 'TPDSrm. prepareReverseReplication.Run' 3PAR_1013 error (id=1408)] Error. Peer array id <4145> is not a valid entry in the connected 3PAR Storage Server.	This error indicates that the requested peer array is not a valid target system for HP 3PAR Remote Copy setup. Check the Remote Copy configuration on the storage array for more information.
Get Virtual Volume information on the HP 3PAR Storage System	Missing expected output content from storage.	[2010-05-27 10:58:47.031 'TPDSrm. checkTestFailoverStart.Run' 3PAR_1018 error (id=5432)] Error. Unable to get detail virtual	This error indicates that storage array returns empty output for the command issued. This can

Table 20 queryReplicationSettingsTroubleshooting Checklist *(continued)*

Problem Area	Problem Description	Example of Key Log Message	Troubleshooting Tips
		volume information. Additional information: <xxxx>	be caused by intermittent network interruption.
Check Remote Copy group status.	Invalid Remote Copy group.	[2010-05-27 16:33:37.734 'TPDSrm. testFailoverStart.Run' 3PAR_1022 error (id=1580)] Error. The specified group <MmmtGroup1.r26> does not exist in the storage array.	This error indicates that the requested group for checking is not available in the storage array. Contact your storage administrator and validate the finding.

Workflow chart



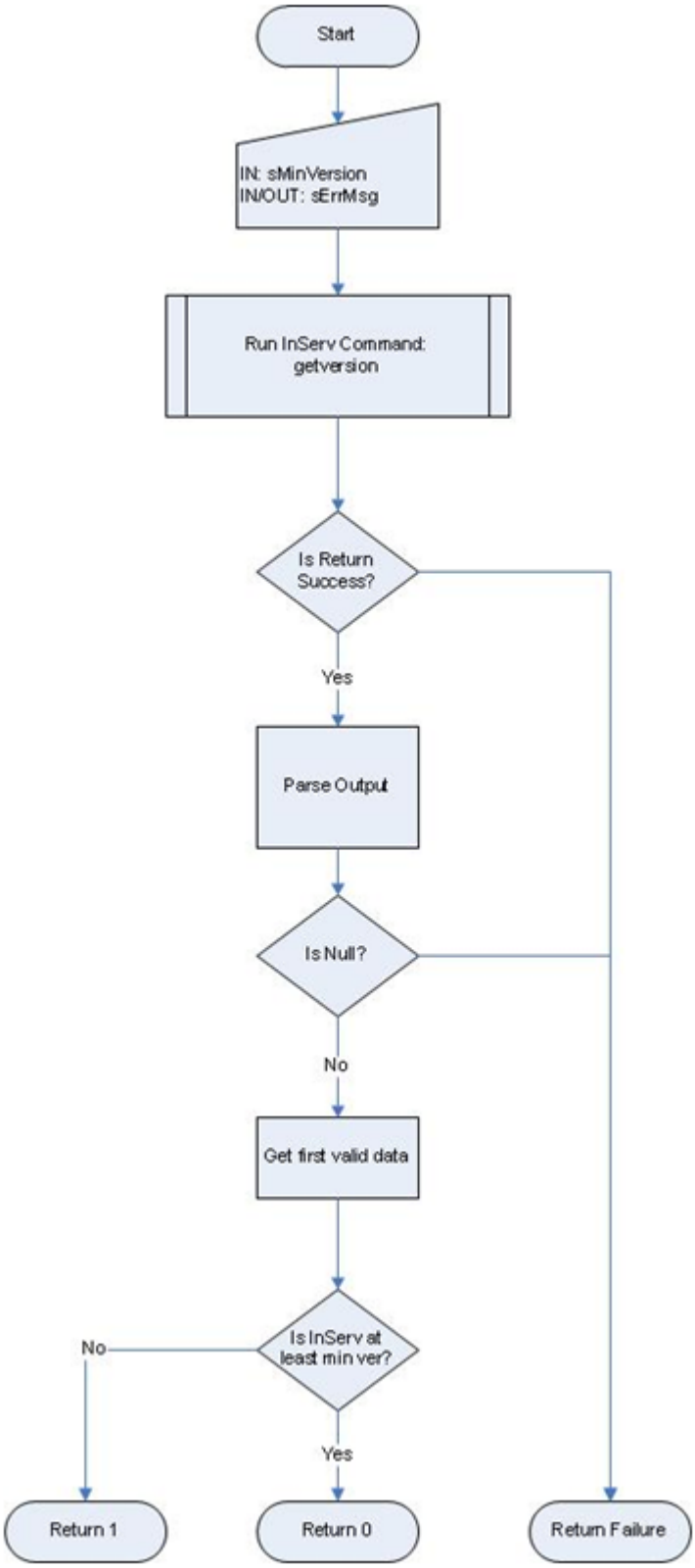
3 Tear-Down Workflows

The following is a list of important tear-down modules that are used in different commands. Following this list are workflow charts for each module.

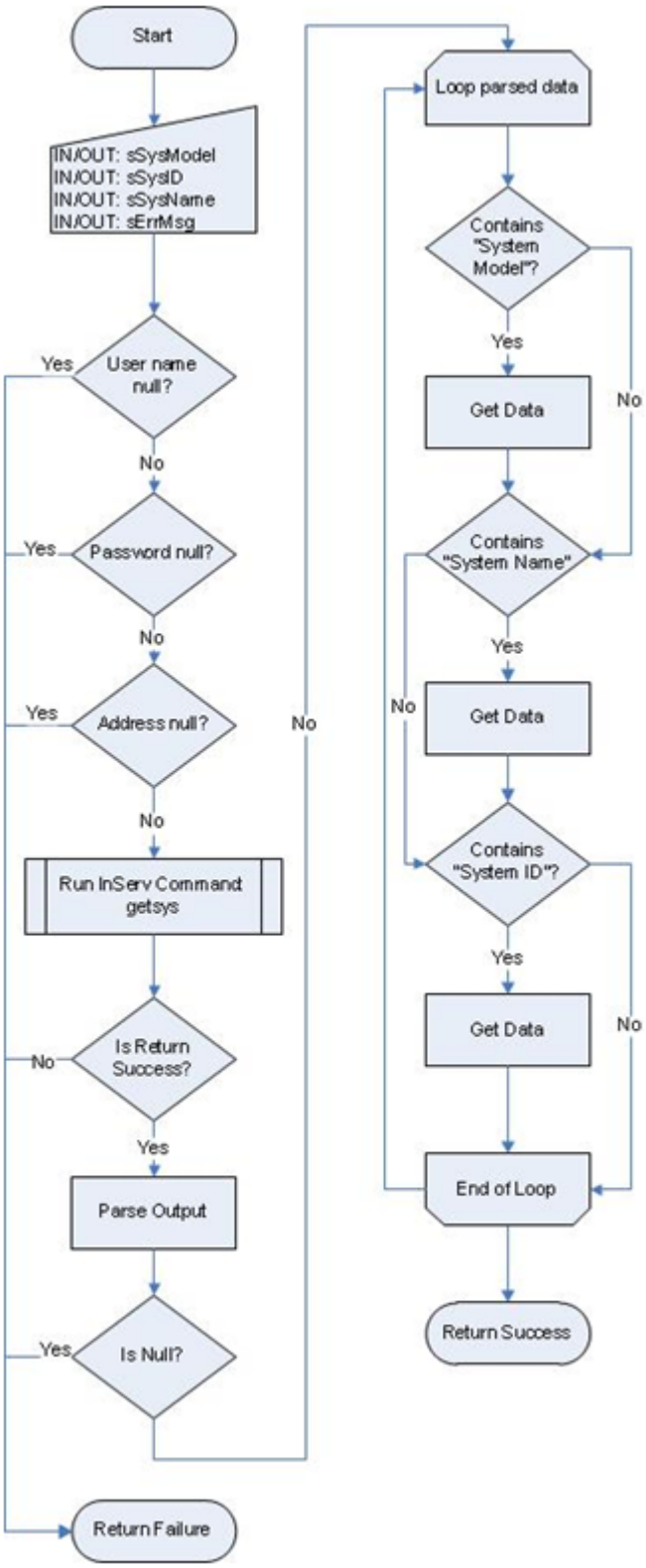
Module	Description
CheckInFormVersion	Checks and validates the connected storage array OS version.
CheckInServConnectivity	Connects to the storage array and get array model information.
CheckInServLicense	Validates the caller's specified license name with the registered license feature in the storage array.
CheckRCLinkStatus	Gets the Remote Copy link status for a specific target server from a storage array and determines its health. If one of the Remote Copy links is up, it is considered to be in connected state.
CreateRCGroupSnapshotForBackup	Creates group snapshot of the base volume before promote or restore operations in case of operation failiure.
CreateRCGroupSnapshotForTest	Creates a group snapshot for failover test.
ExposeVvToSingleHost	Creates a VLUN on the specified host name.
FailoverRCGroup	Executes the Remote Copy failover/restore/reverse operation depending on the current group role and the group status.
FillTestSnahsotInfo	Gathers the test snapshot information and returns the information to the caller.
GetDetailRCInformation	Gathers all Remote Copy information in the storage array.
GetInFormVersion	Retrieves the InForm OS version from the storage array.
GetInServHostInformation	Retrieves the host-to-port mapping list from storage array.
GetInServPortInformation	Retrieves the node:slot:port to connection-type mapping list.
GetInServTime	Retrieves the storage array time information.
GetInServVVInformation	Retrieves the entire virtual volume information on the storage system and builds an array for easy access
GetNextAvailableLunNo	Retrieves the next available LUN for a specified virtual volume.
GetRCGroupLastSyncTime	Retrieves the last synchronized time of a group.
GetRCGroupStatus	Retrieves the current Remote Copy group status.
GetRCTargetSysInfo	Retrieves the Remote Copy Target system mapping list.
GetRecoveryInformationById	Retrieves the recovery information from the recovery ID parameter that is passed into the GetRecoveryInformationByID module. If the ID is null, the module will generate identification on the fly and get the base volume information.
GetRecoveryInformationByVvName	Retrieves the recovery information associated with a virtual volume name.
GetTaskStatus	Retrieves the task information by the task ID.

Module	Description
GetTaskStatusByType	Retrieves the task list by a task type specified by the caller.
GetVvAssocVLunInfo	Retrieves LUN exposure information for a specified virtual volume.
GetVvInfoByVVID	Retrieves the requested virtual volume information by searching through the cached VV array.
PromoteDataToRecoveryPoint	Promotes the virtual volume to the specific snapshot (recovery point).
PromoteSnapshotToParent	Promotes the specified snapshot to the targeted read-writable parent identified by the caller.
RecoverRemoteCopyGroup	Executes the Remote Copy recover command to officially reverse the replication direction on the Remote Copy group.
RemoveGroupSnapshots	Removes the group snapshots specified in the input snapshot array.
StartRemoteCopyGroup	Starts a specified Remote Copy group.
StopRemoteCopyGroup	Stops a specified Remote Copy group.
SyncRemoteCopyGroup	Initiates the synchronization process for a Remote Copy group.
UndoRemoteCopyGroupRole	Reverses the role changes caused by failover operation.
UnExposeVVFromAllHosts	Removes all LUN exposures created for test snapshots.
UnExposeVVFromHost	Removes LUN exposure of a virtual volume from a specified host.
WaitingForPromoteCompletion	Monitors the completion of stopping a Remote Copy group for the process involving volume promotion, which runs in the background.

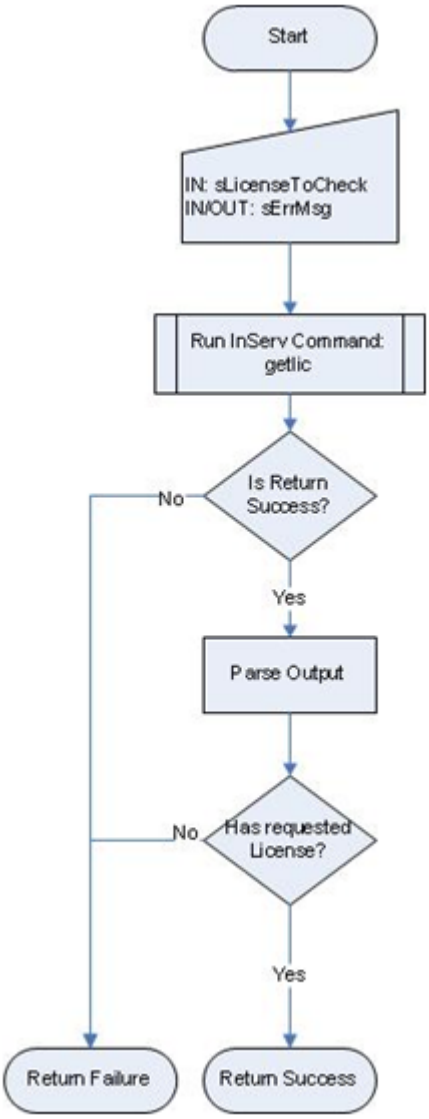
CheckInFormVersion



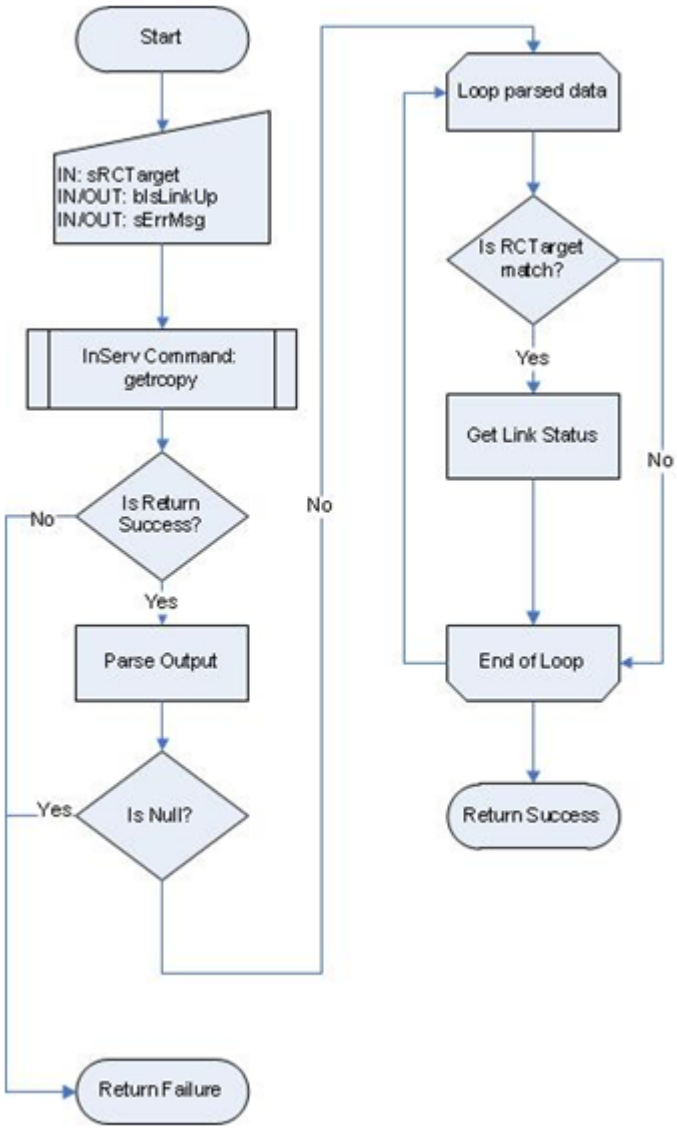
CheckInServConnectivity



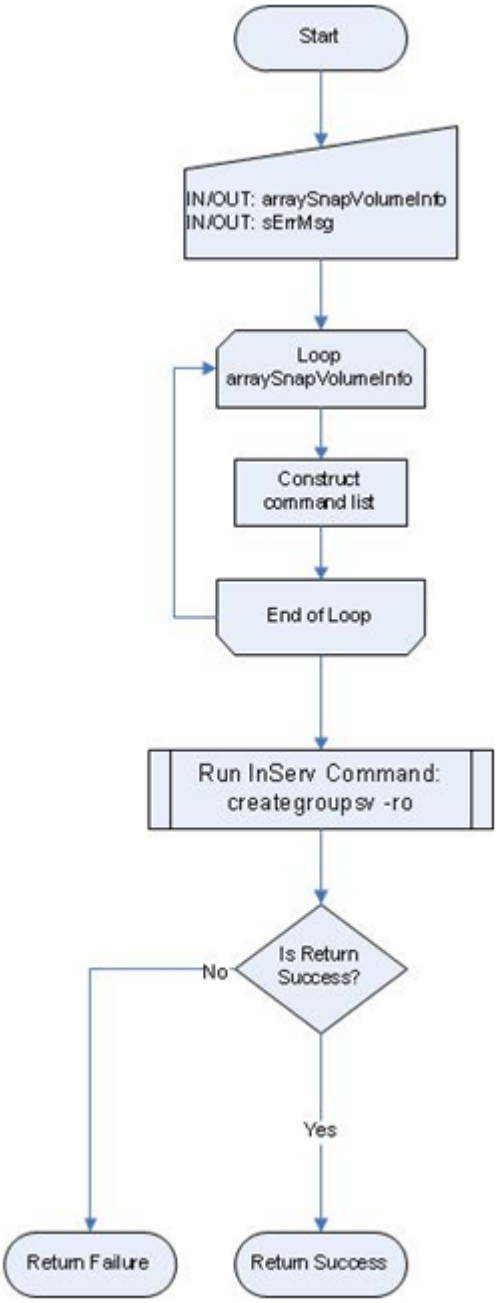
CheckInServLicense



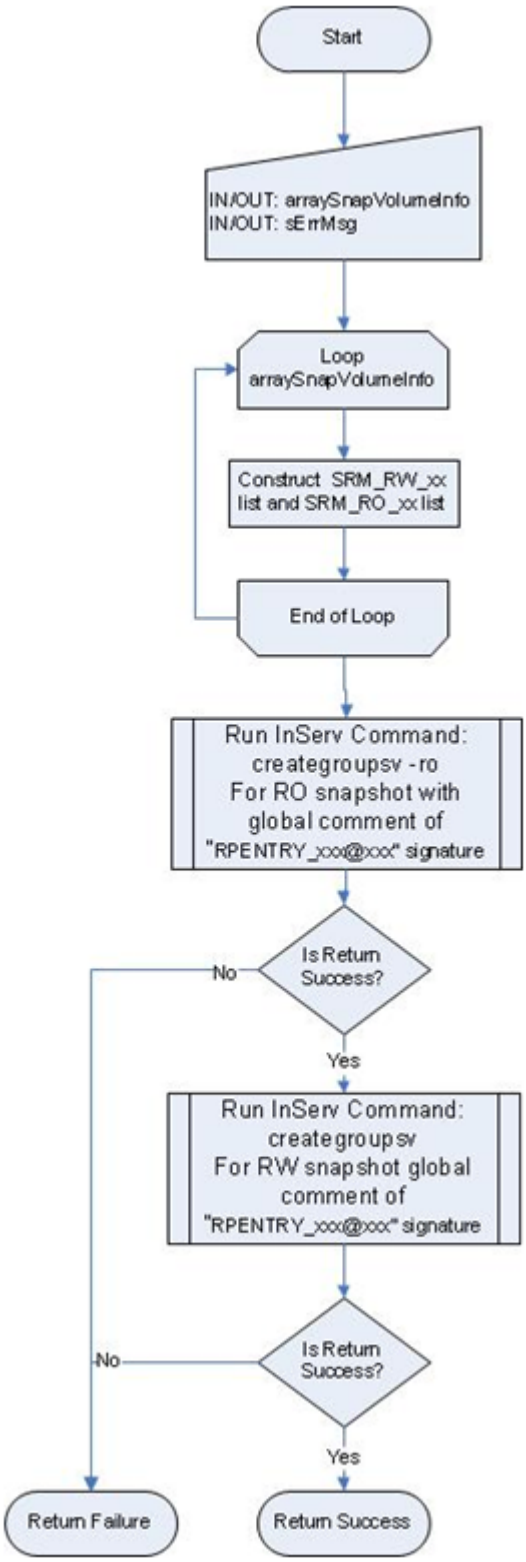
CheckRCLinkStatus



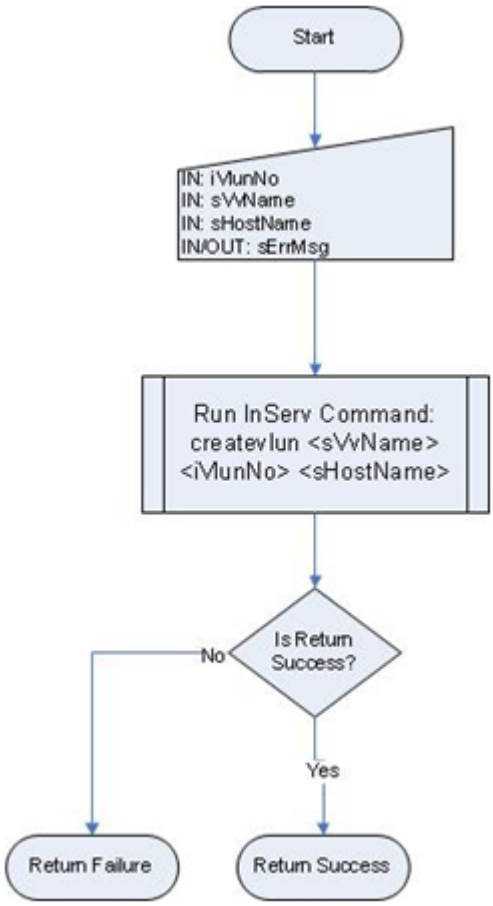
CreateRCGroupSnapshotForBackup



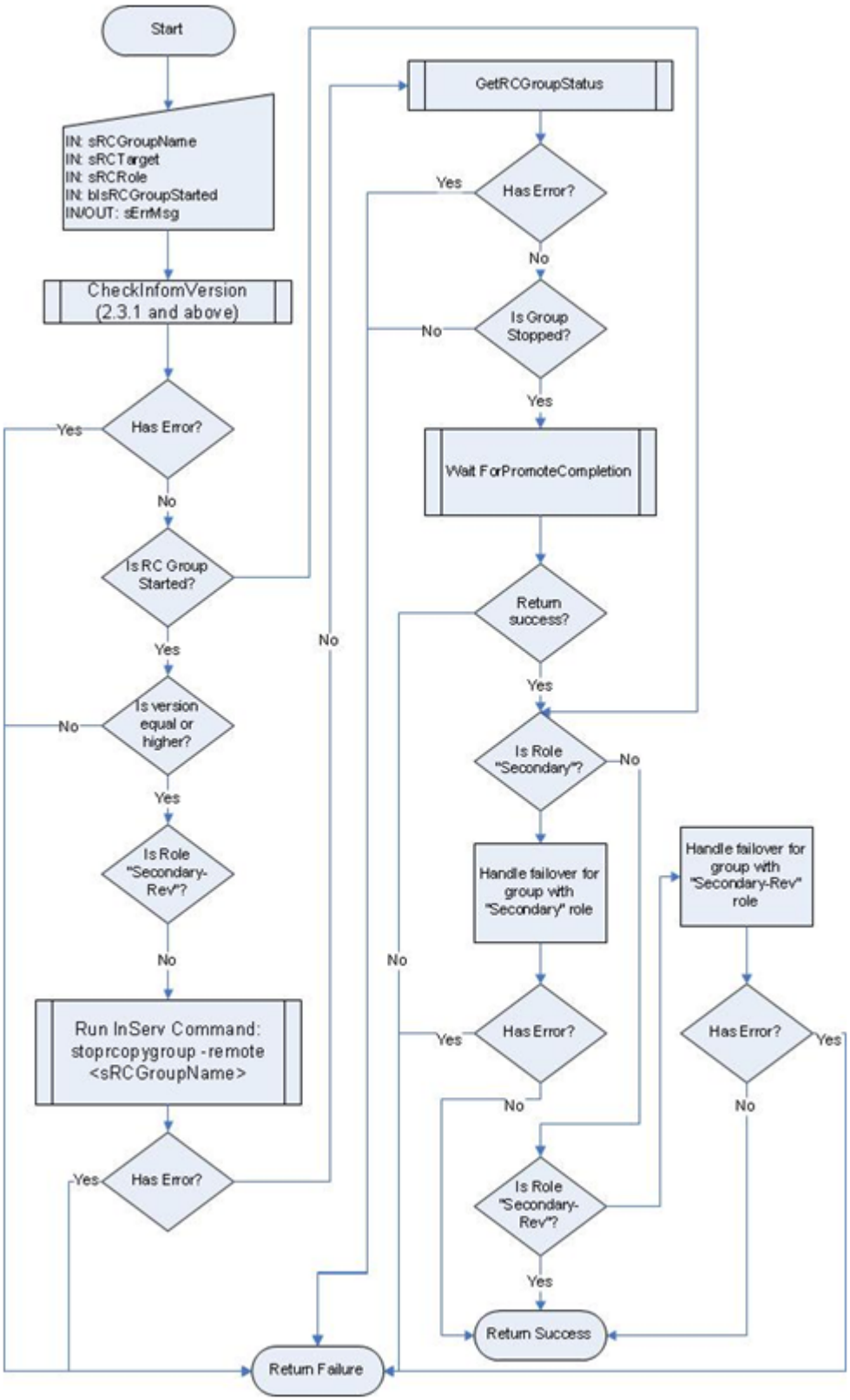
CreateGroupSnapshotForTest

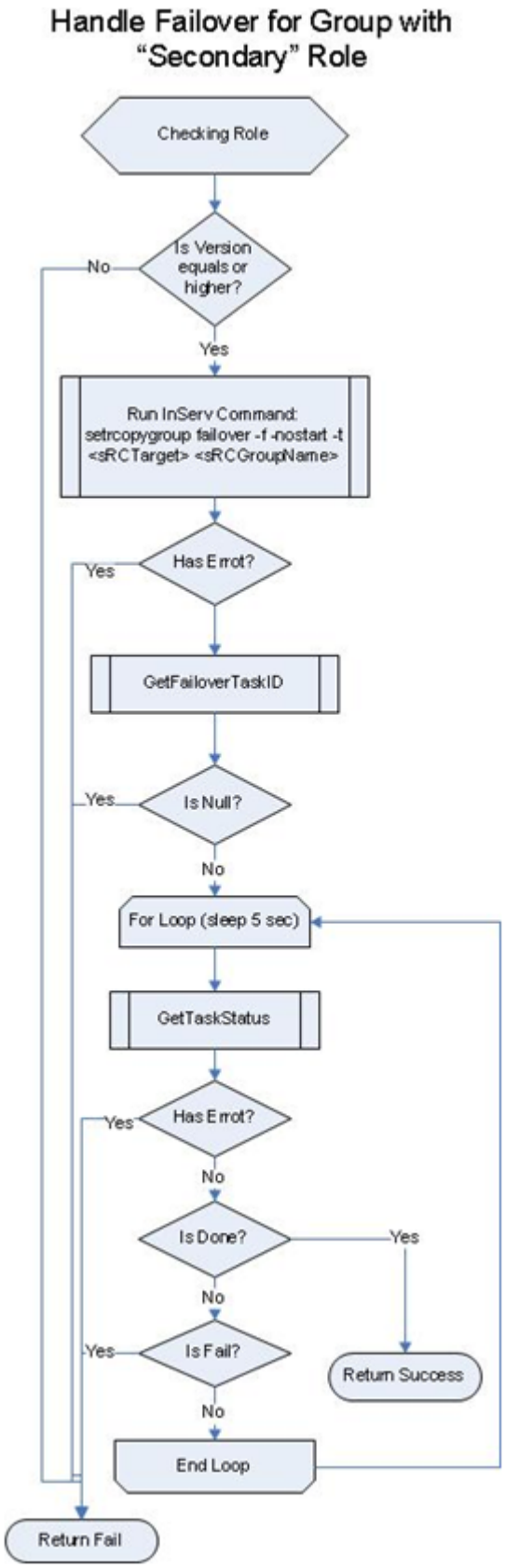


ExposeVvToSingleHost

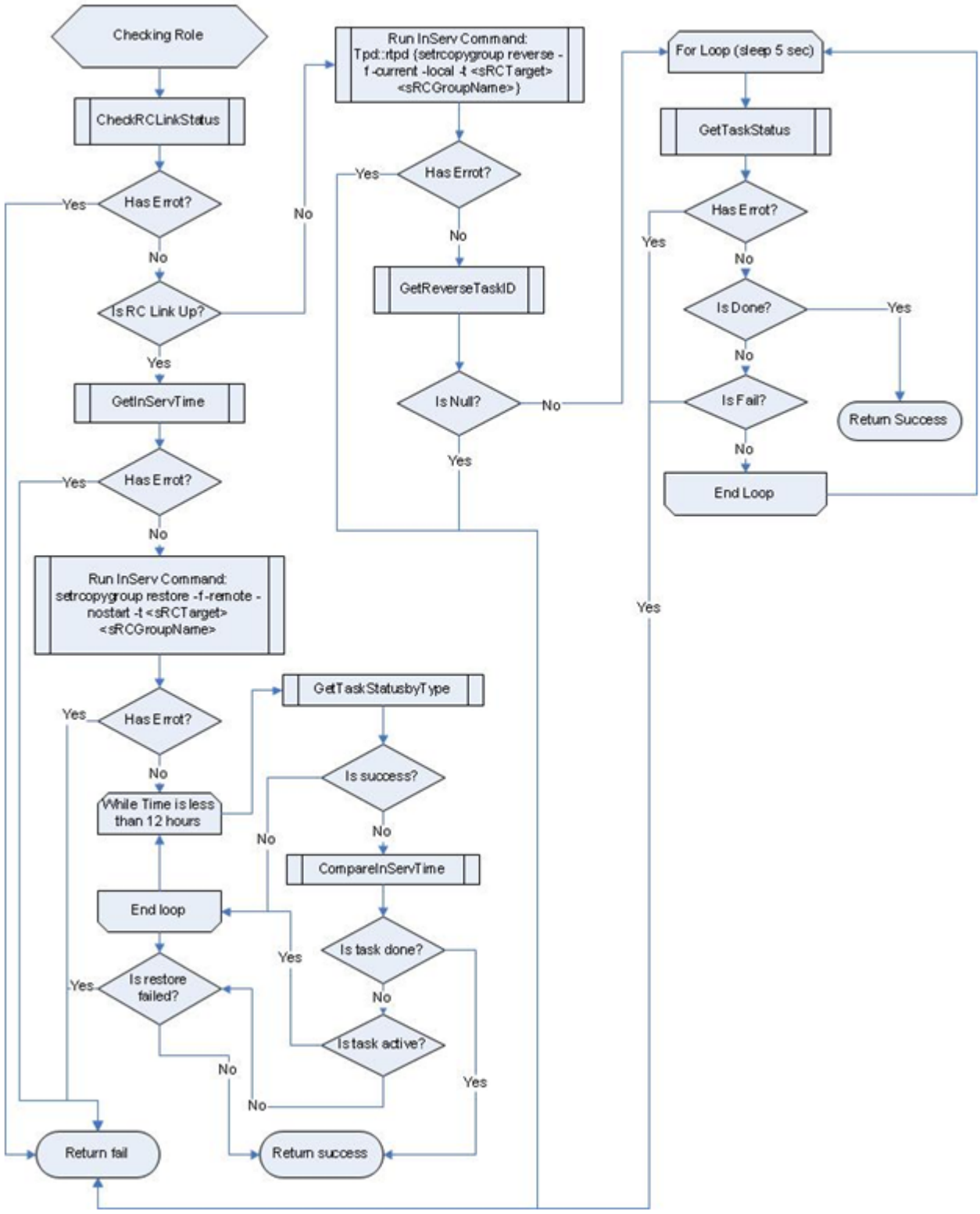


FailoverRCGroup

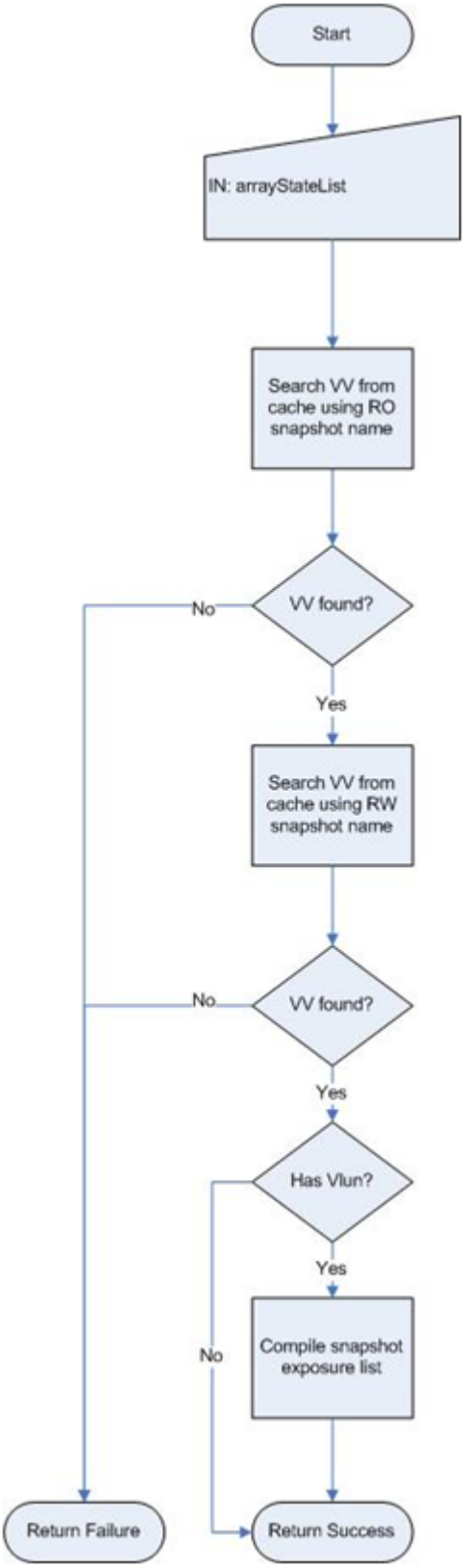



Handle Failover for Group with "Secondary" Role
Checking Role
Is Version equals or higher?
No
Yes
Run InServ Command: setrcopygroup failover -f -nostart -t <sRCTarget> <sRCGroupName>
Has Errot?
Yes
GetFailoverTaskID
Is Null?
Yes
No
For Loop (sleep 5 sec)
GetTaskStatus
Has Errot?
Yes
No
Is Done?
Yes
No
Is Fail?
Yes
Return Success
No
End Loop
Return Fail

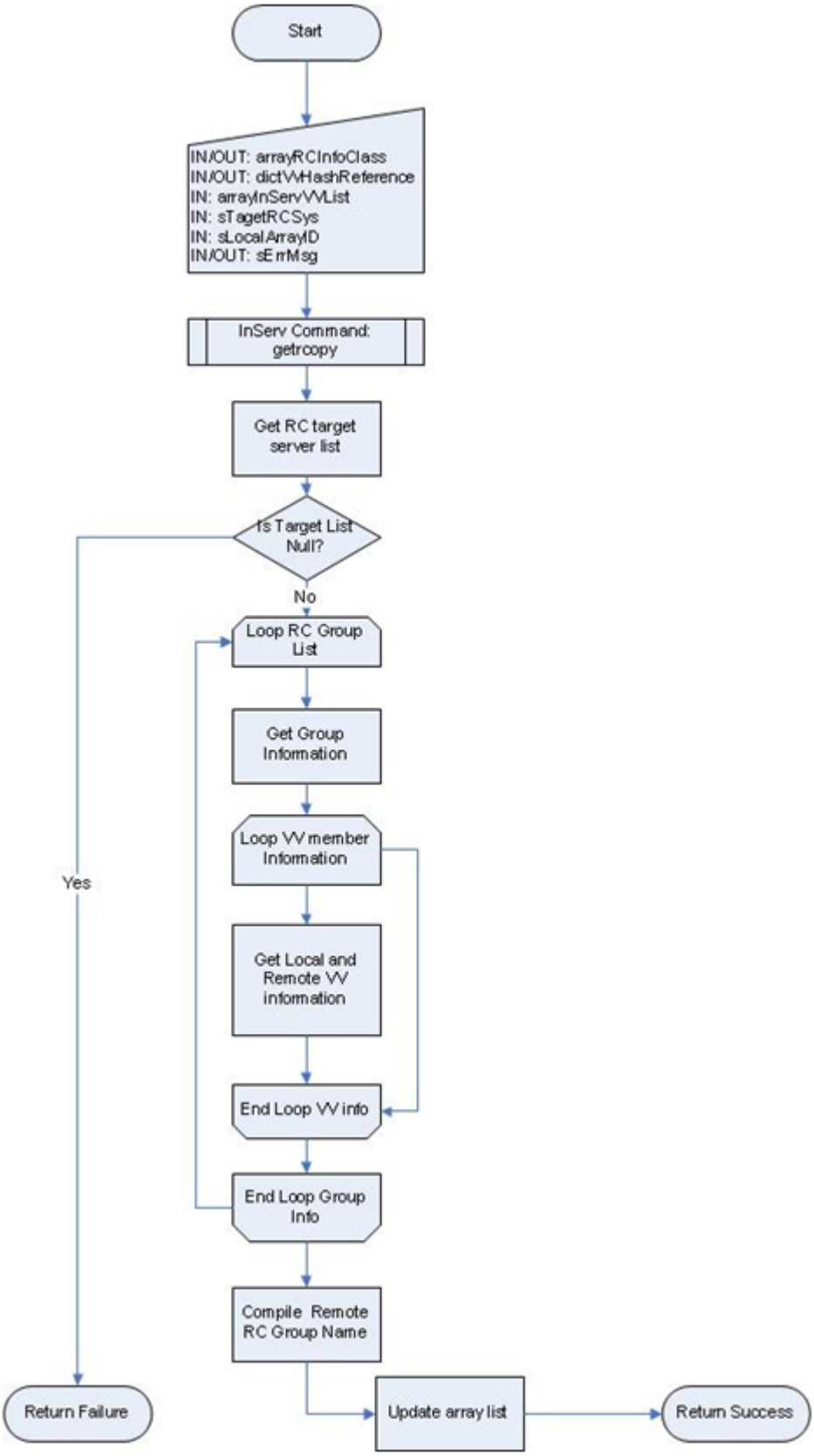
Handle Failover for Group with "Secondary-Rev" Role



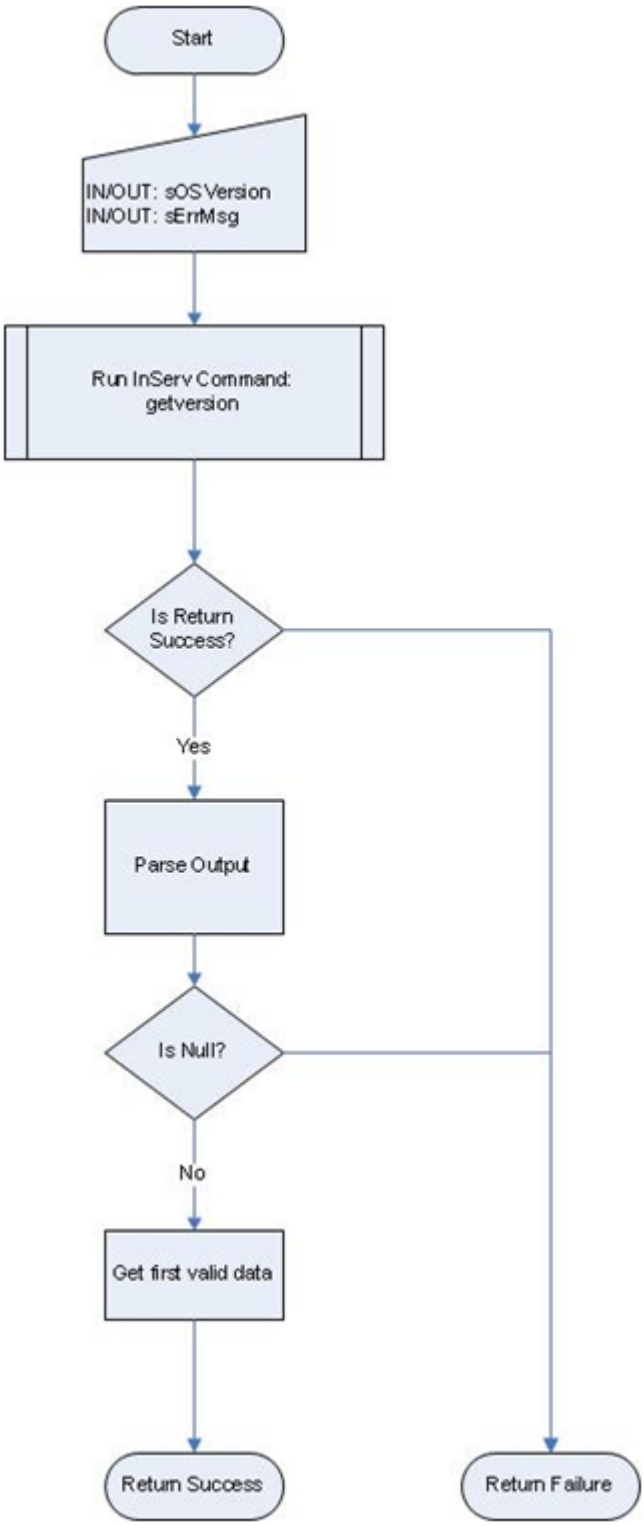
FillTestSnapshotInfo



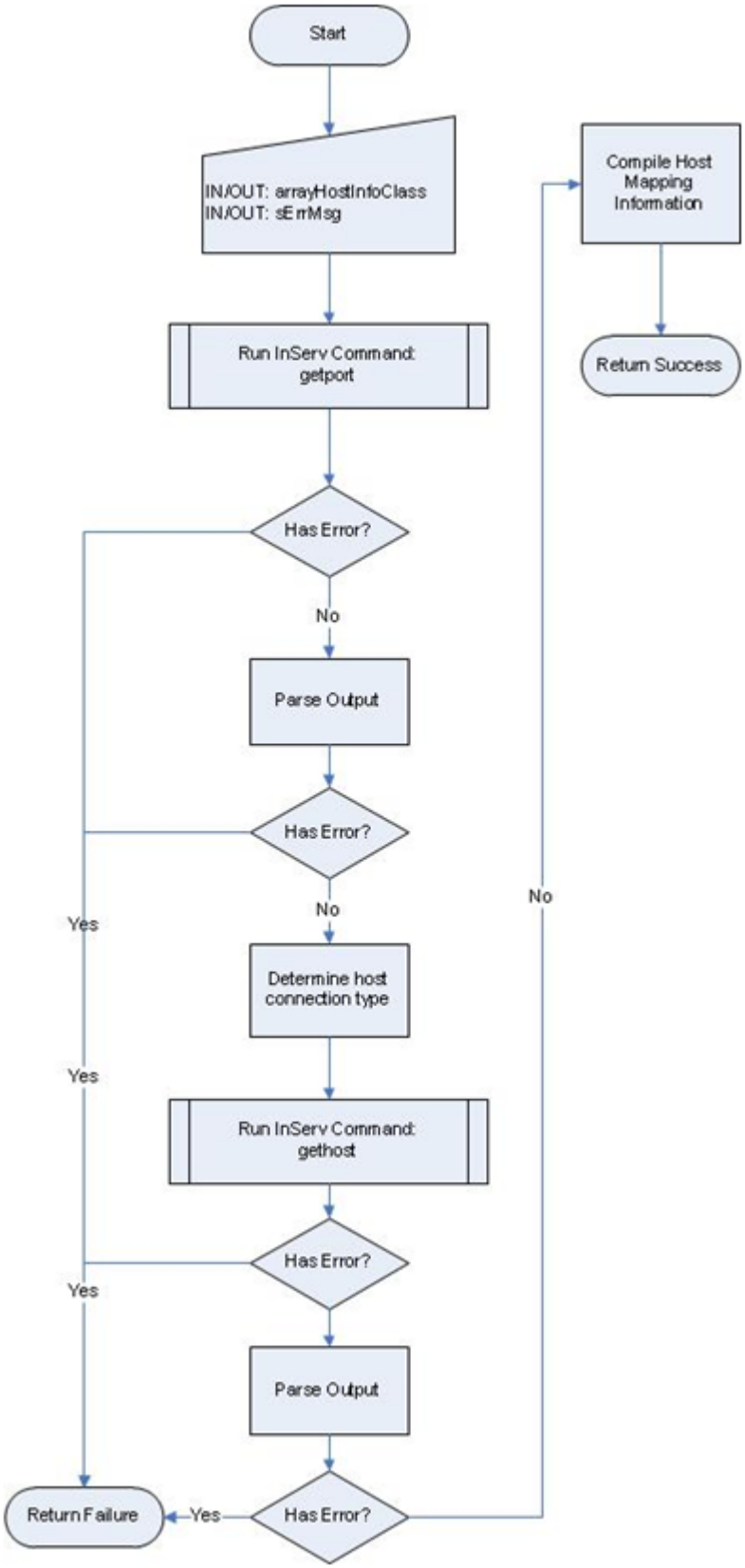
GetDetailRCInformation



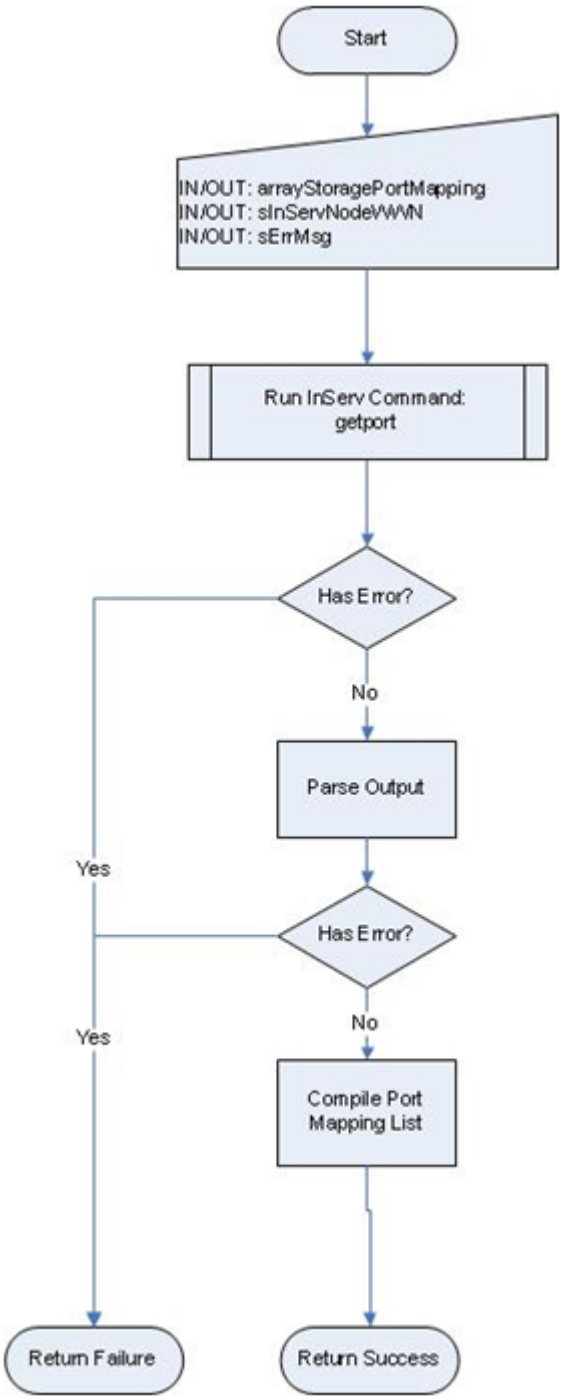
GetInFormVersion



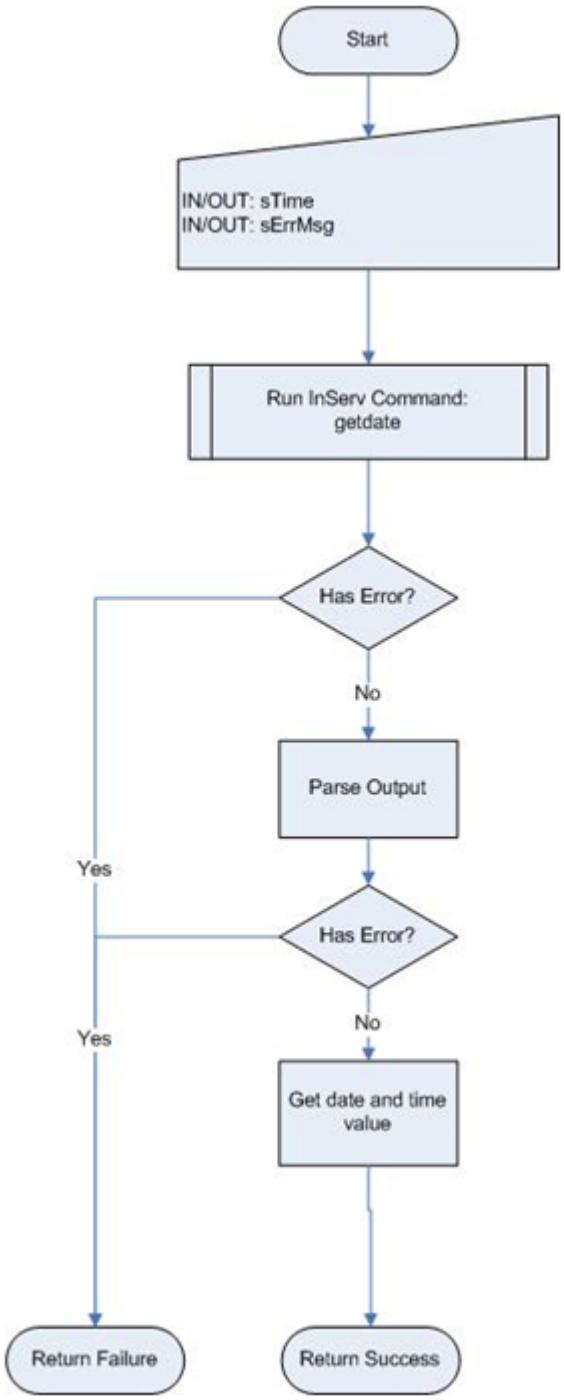
GetInServHostPortInformation



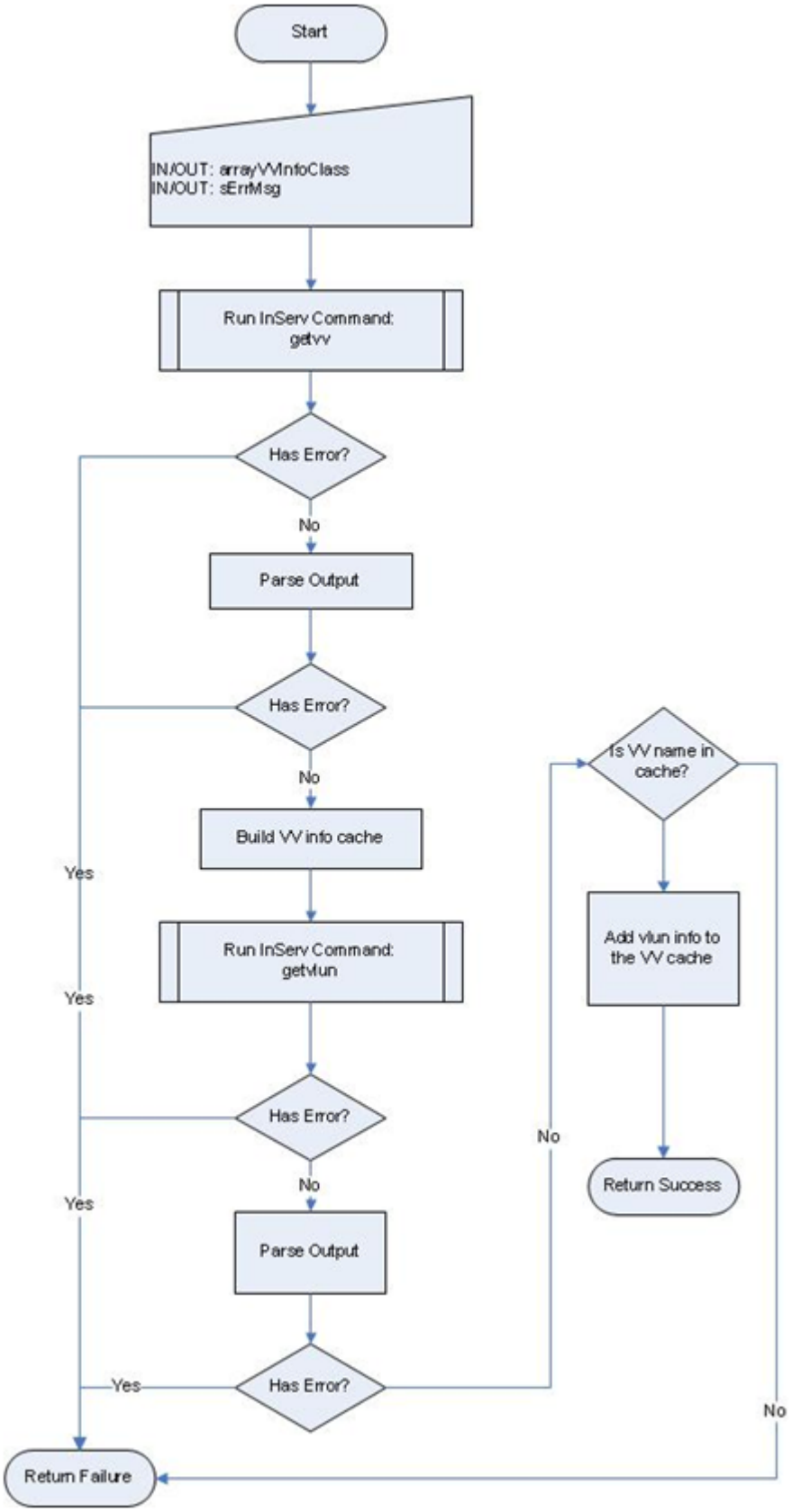
GetInServPortInformation



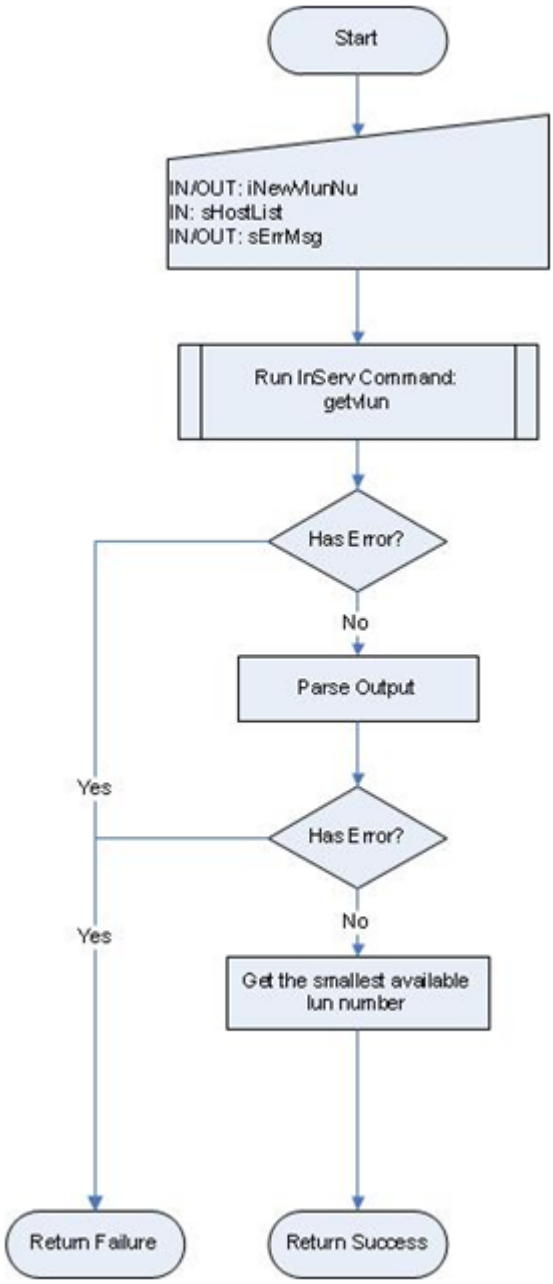
GetInServTime



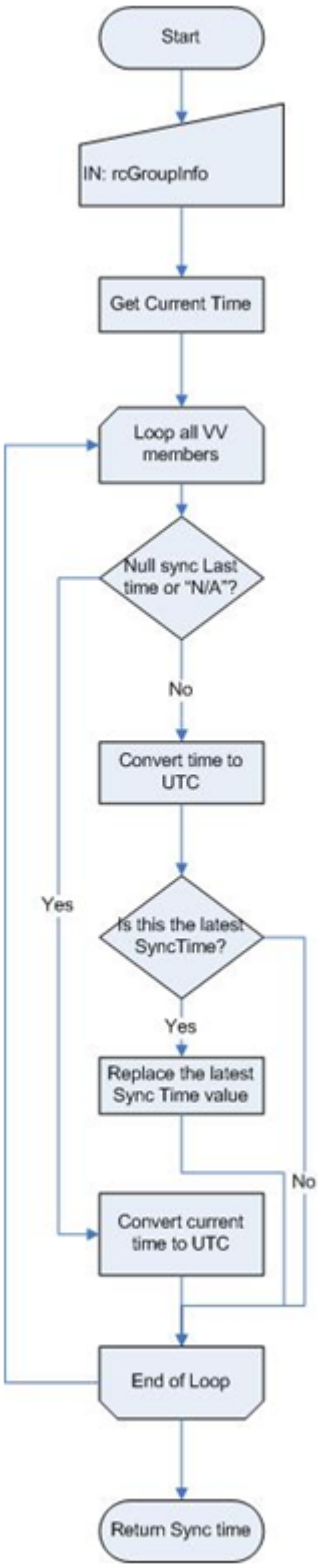
GetInServVVInformation



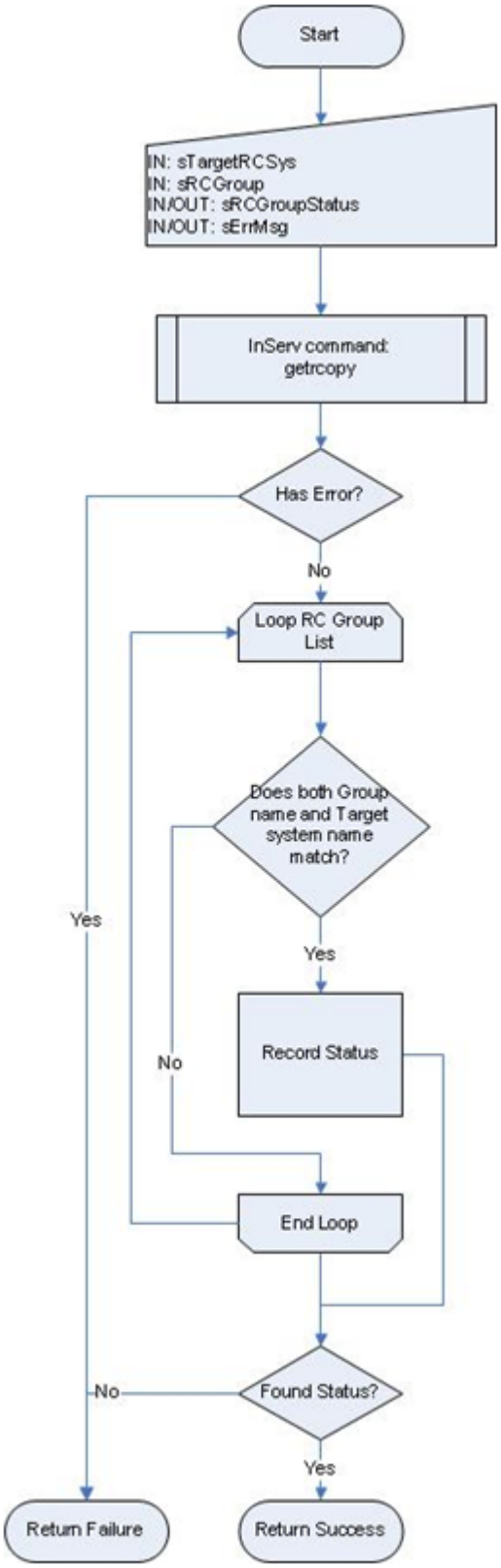
GetNextAvailableLunNo



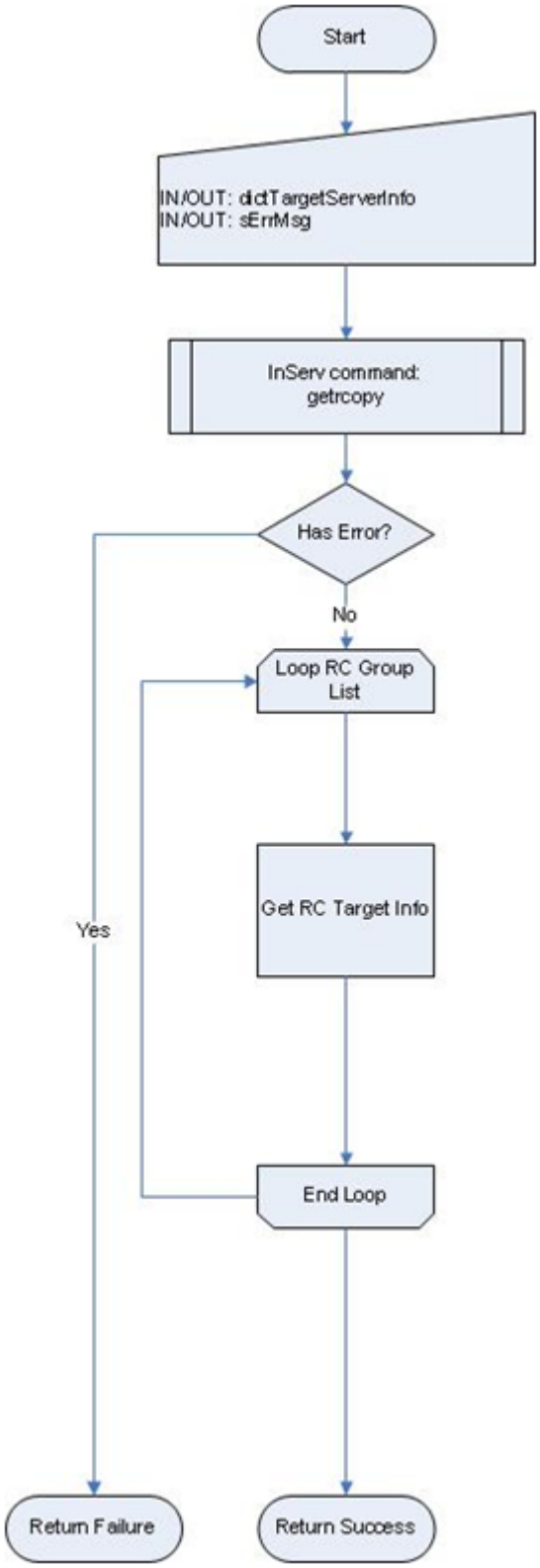
GetRCGroupLastSyncTime



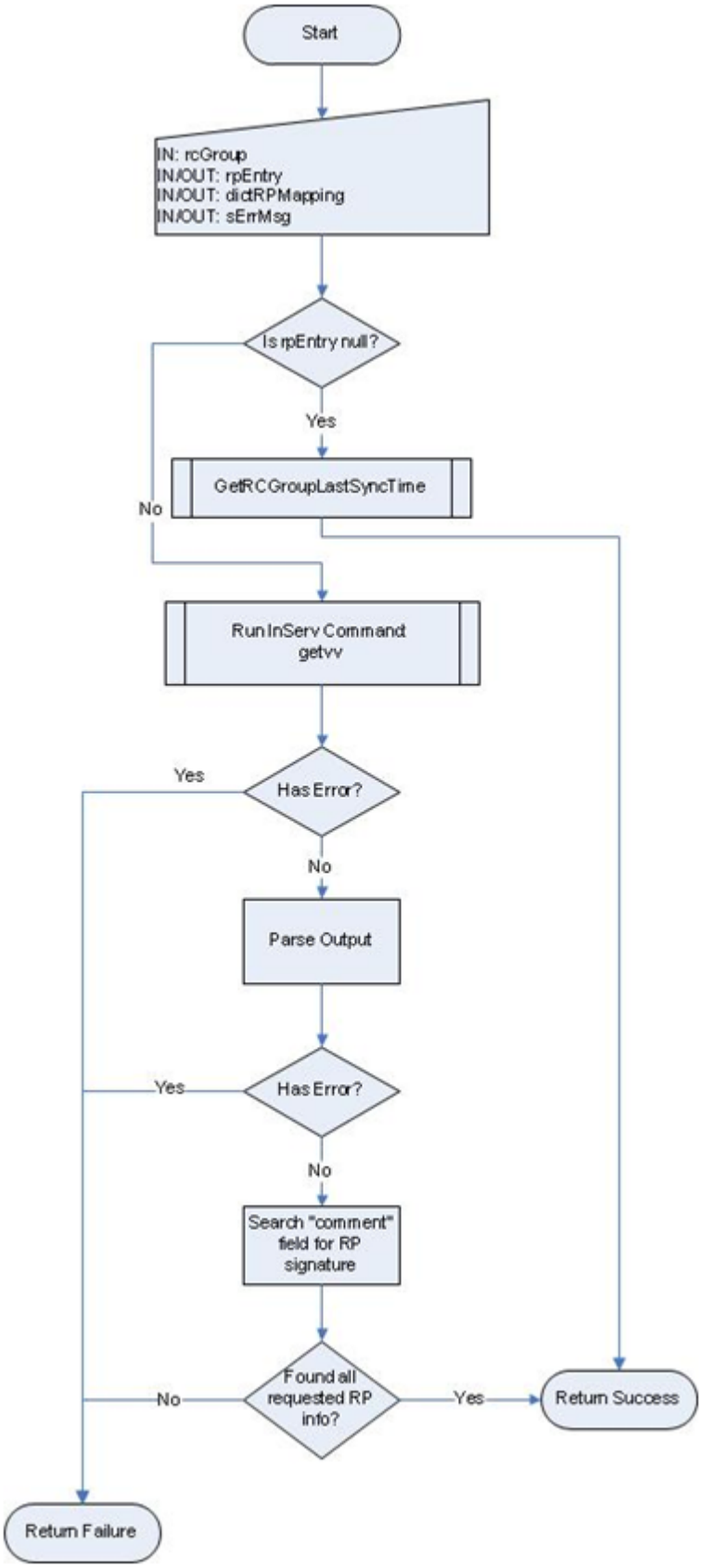
GetRCGroupStatus



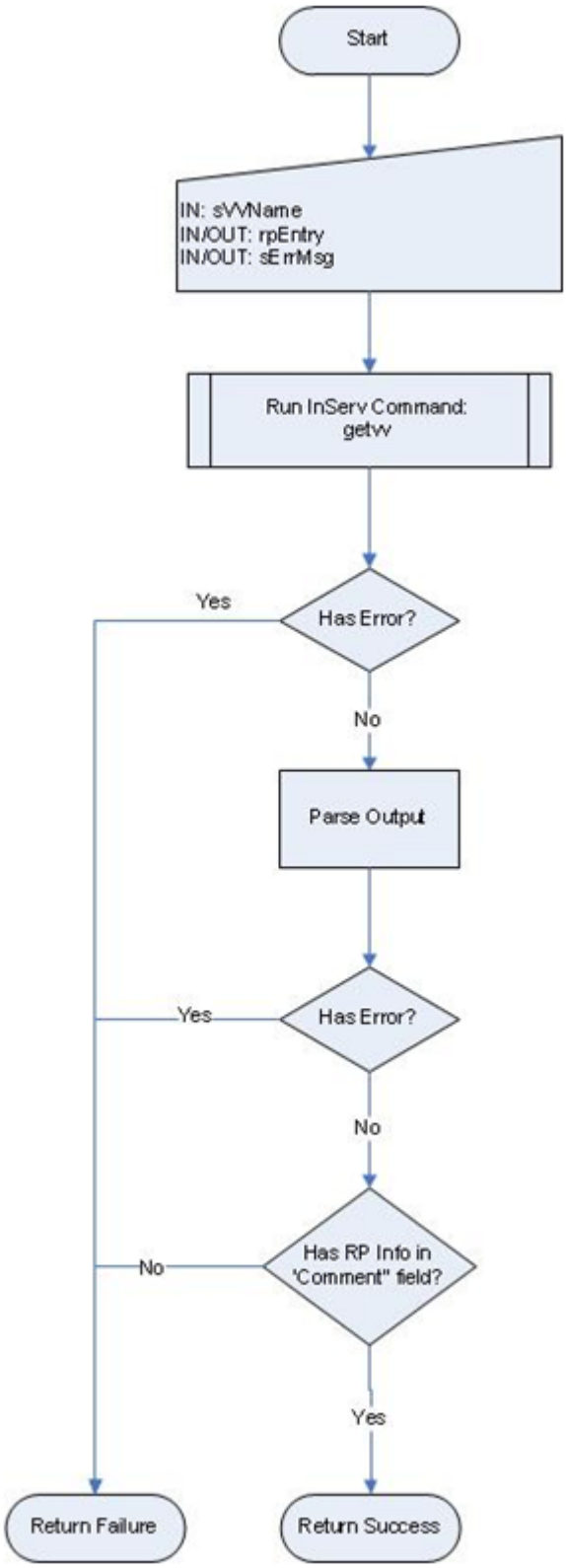
GetRCTargetSysInfo



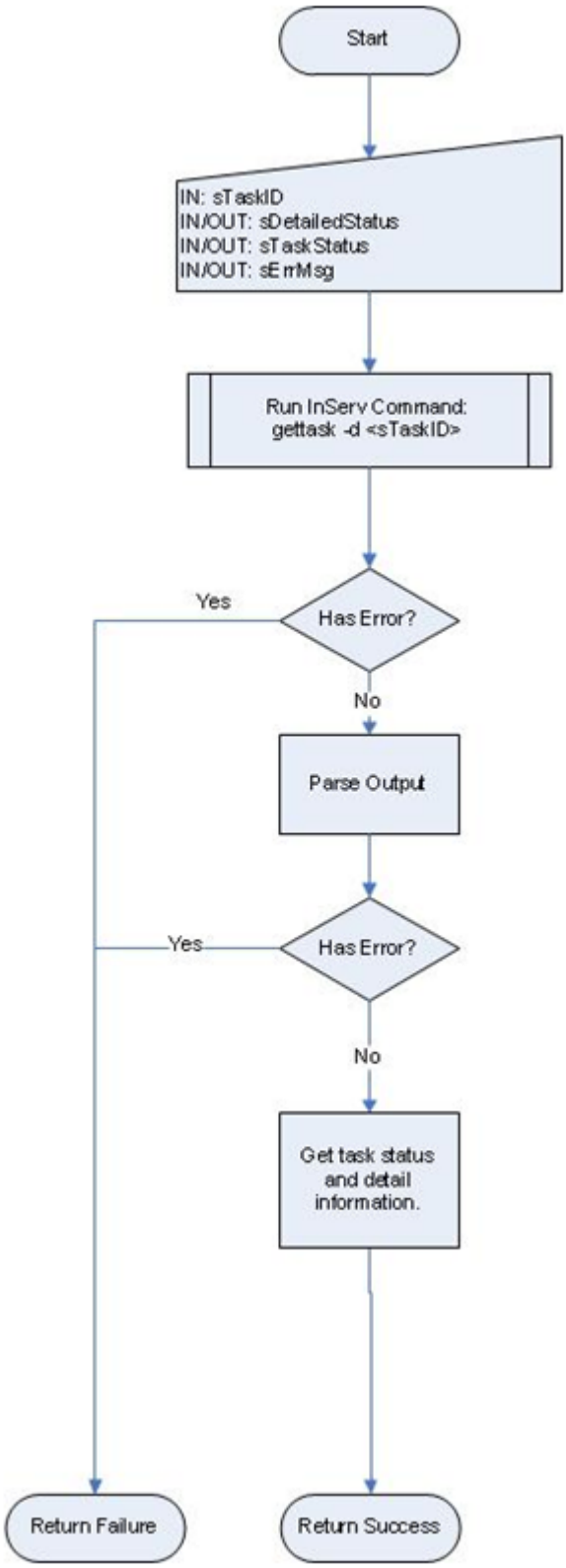
GetRecoveryInformationById



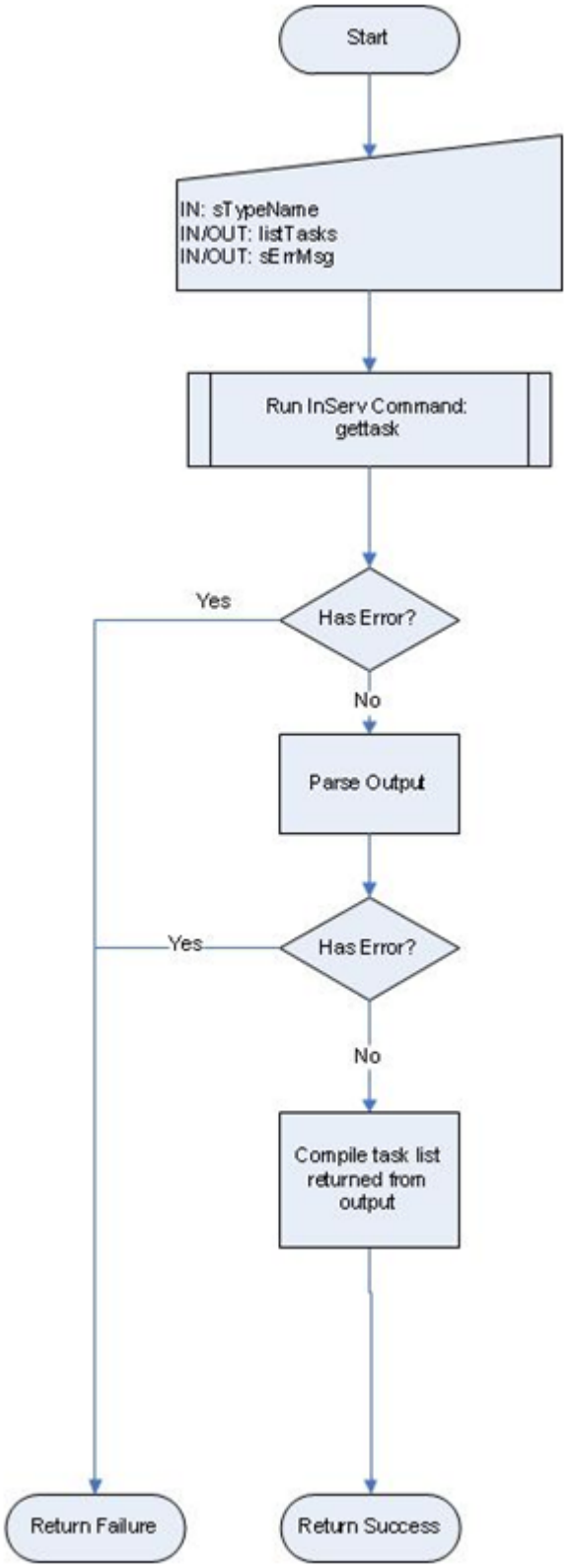
GetRecoveryInformationbyVvName



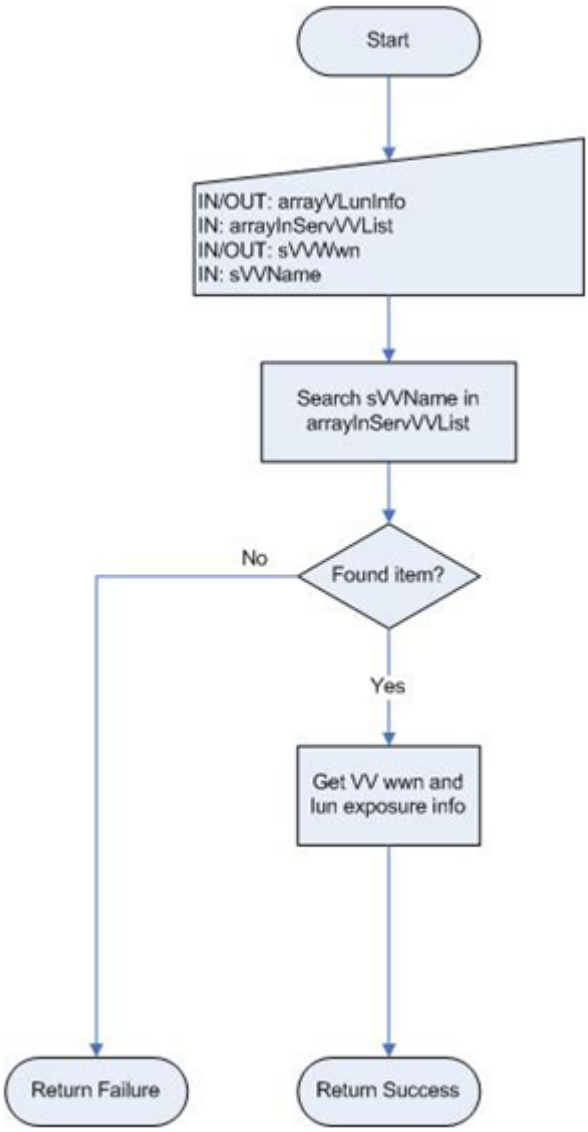
GetTaskStatus



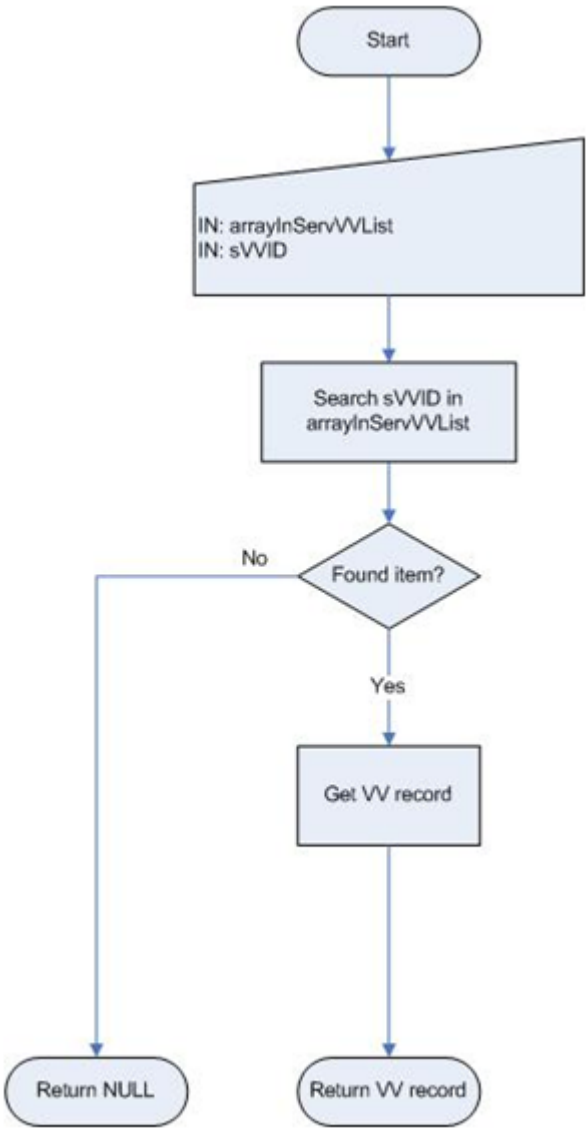
GetTaskStatusByType



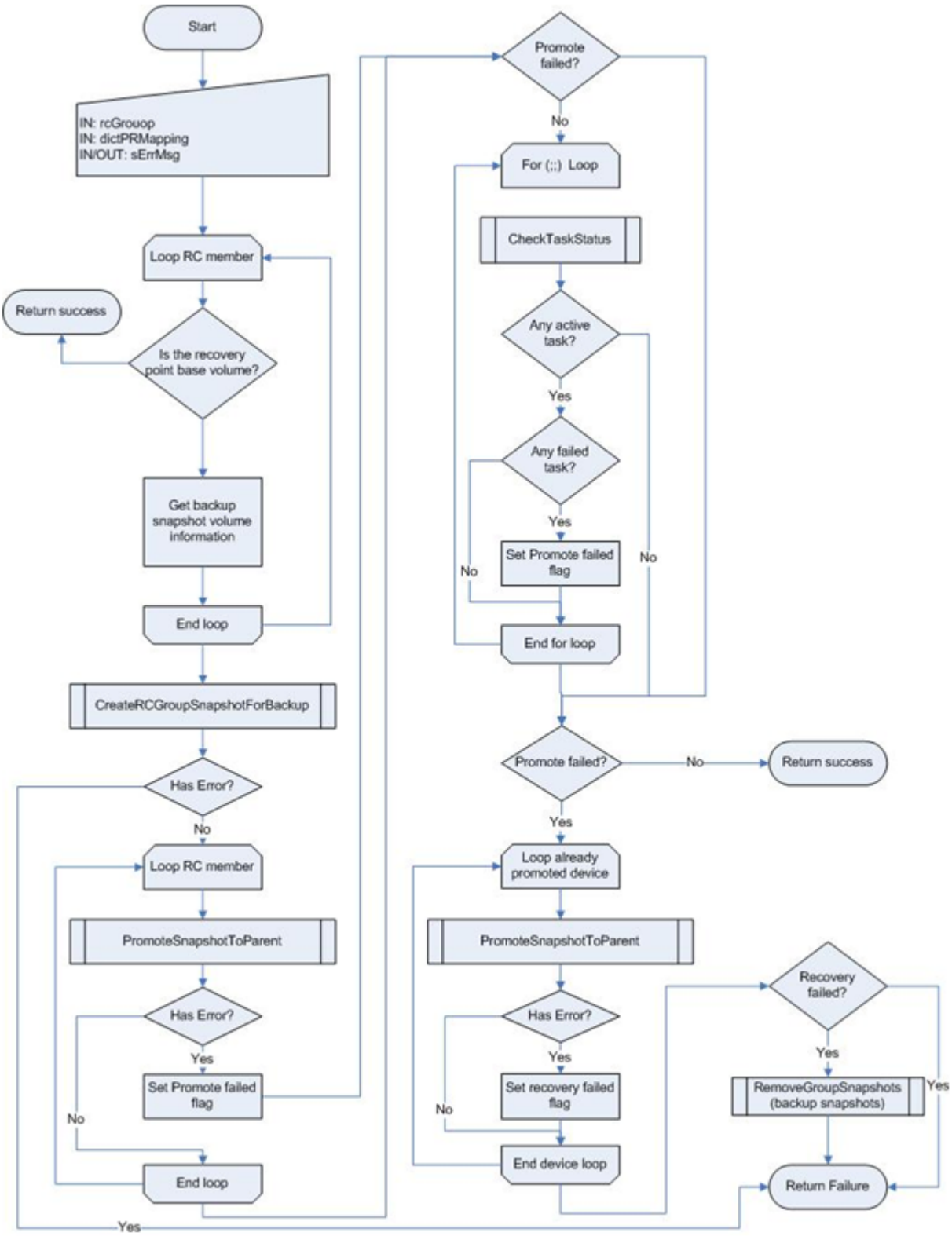
GetVvAssocVLunInfo



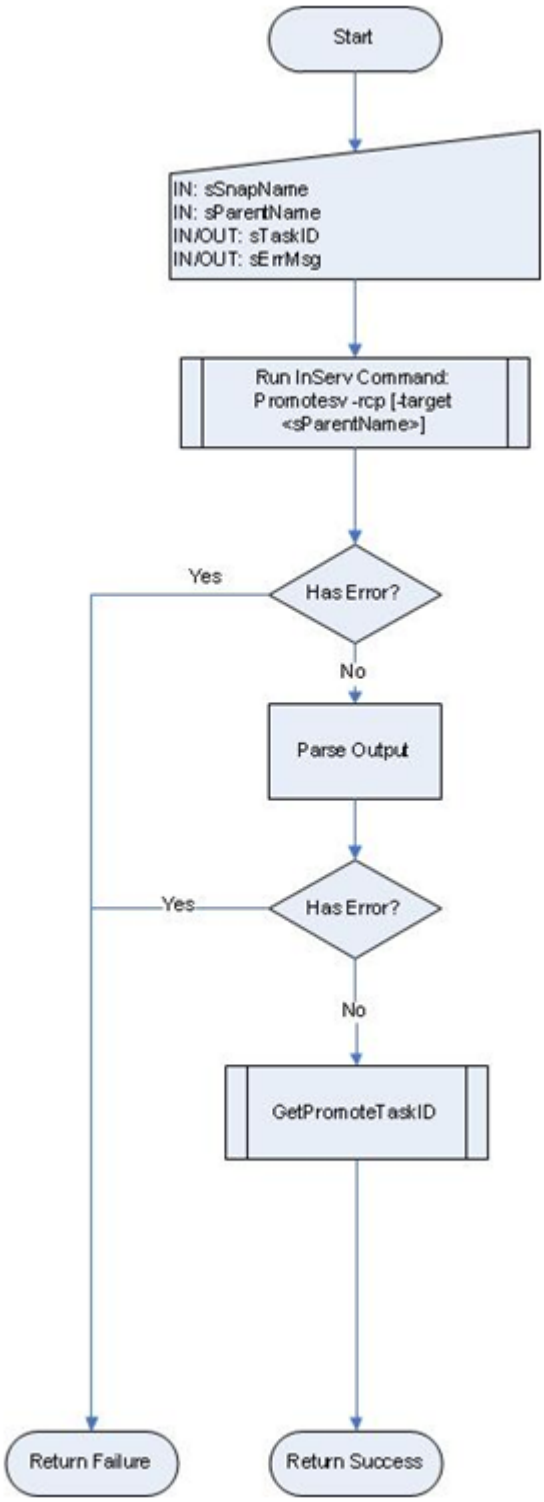
GetVVInfoByVVID



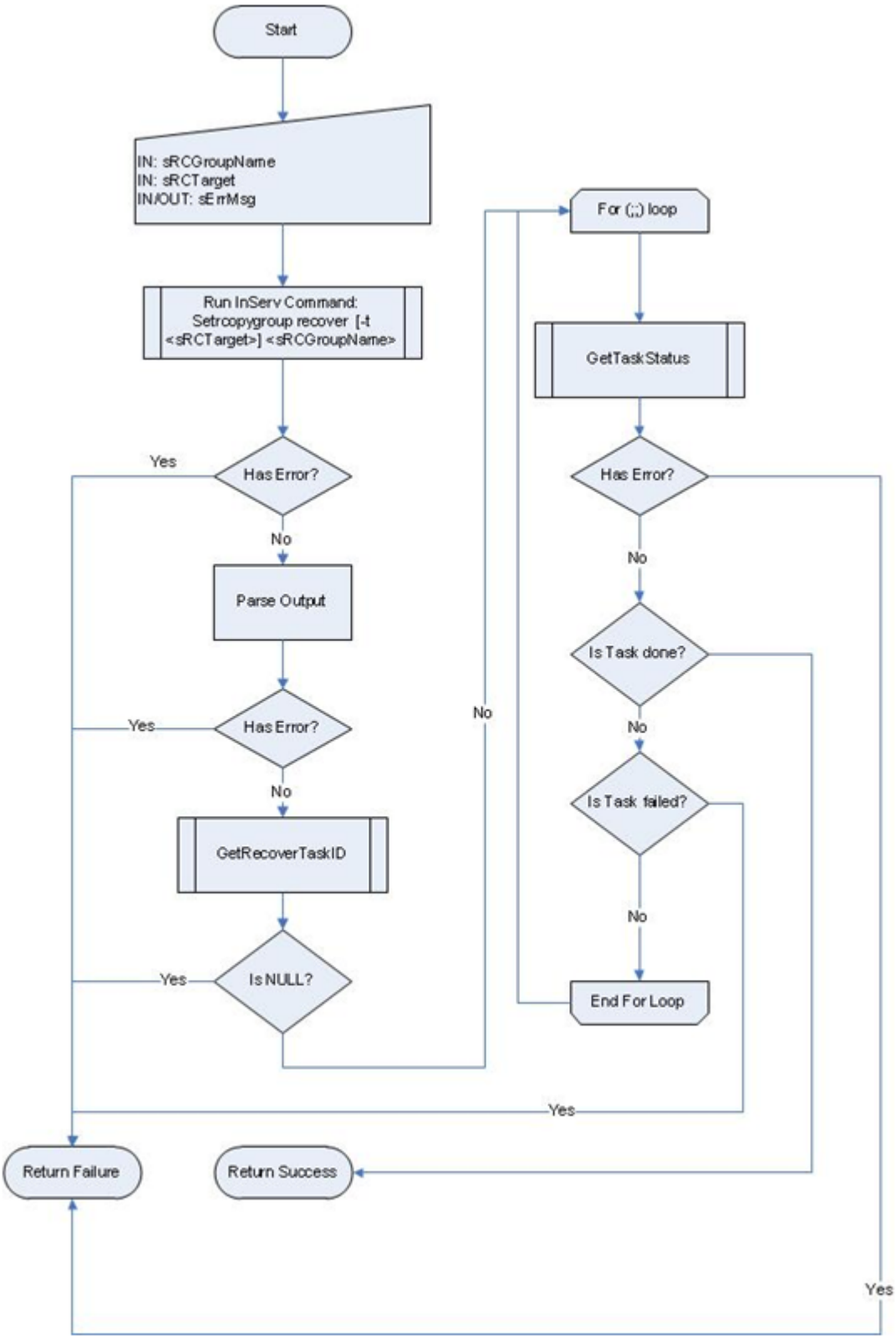
PromoteDataToRecoveryPoint



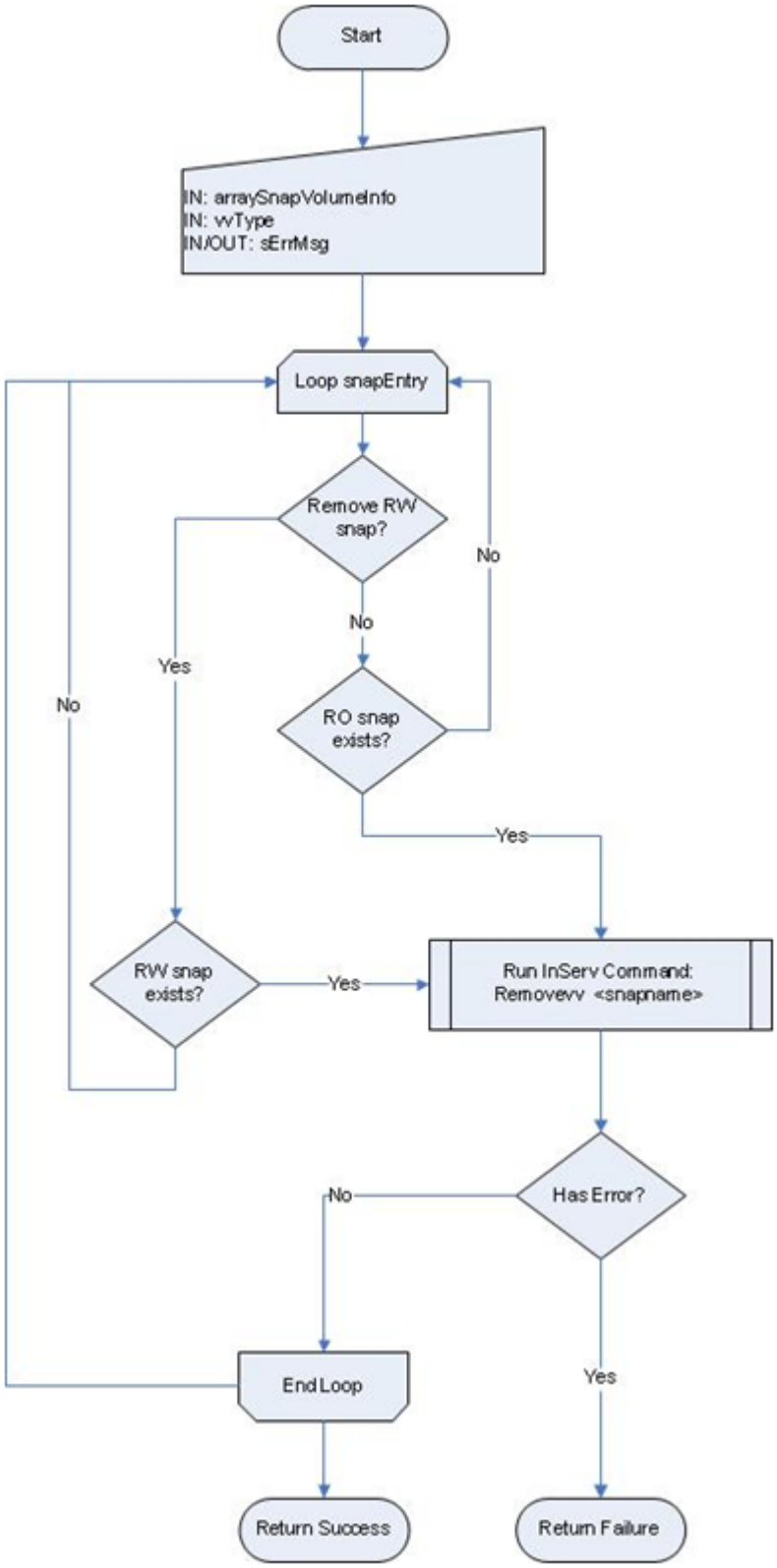
PromoteSnapshotToParent



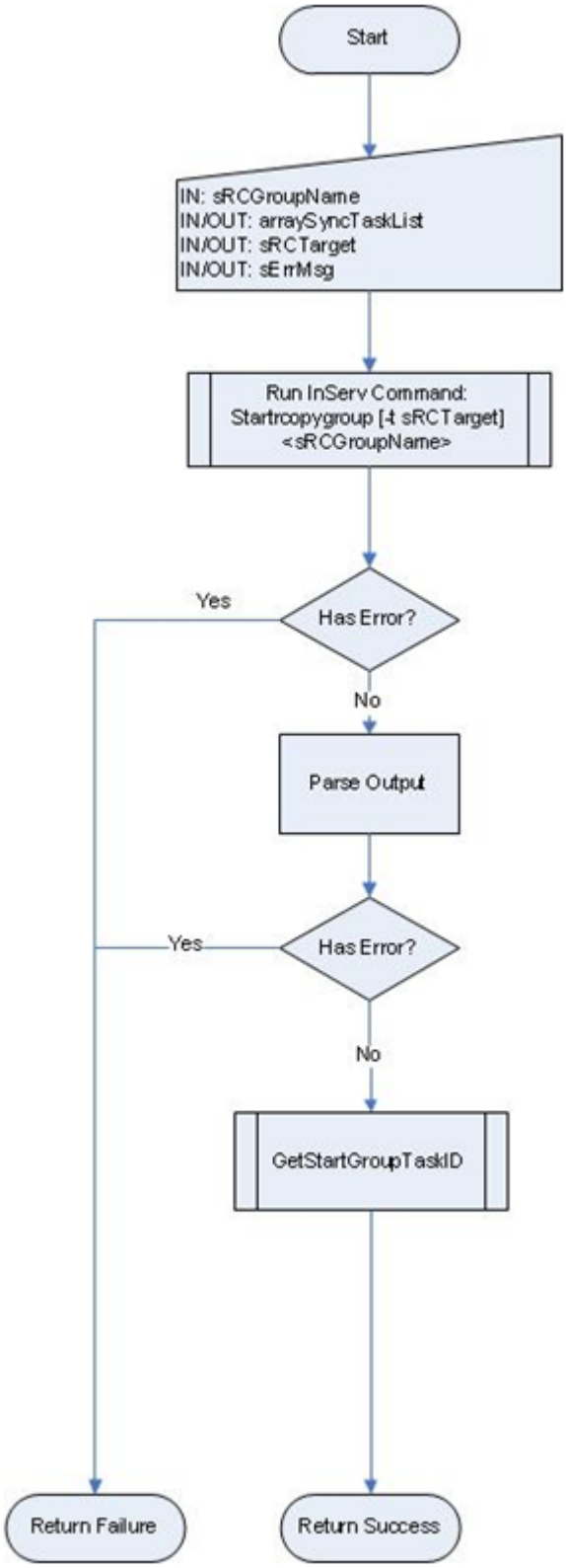
RecoverRemoteCopyGroup



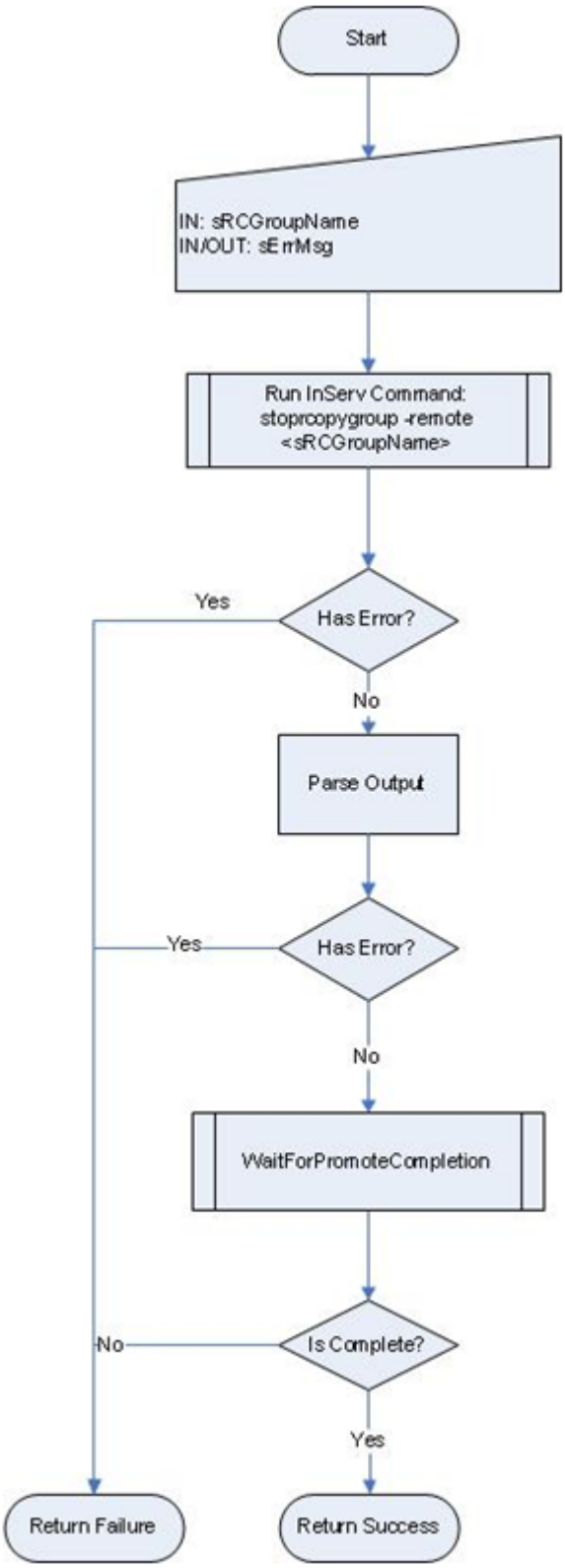
RemoveGroupSnapshots



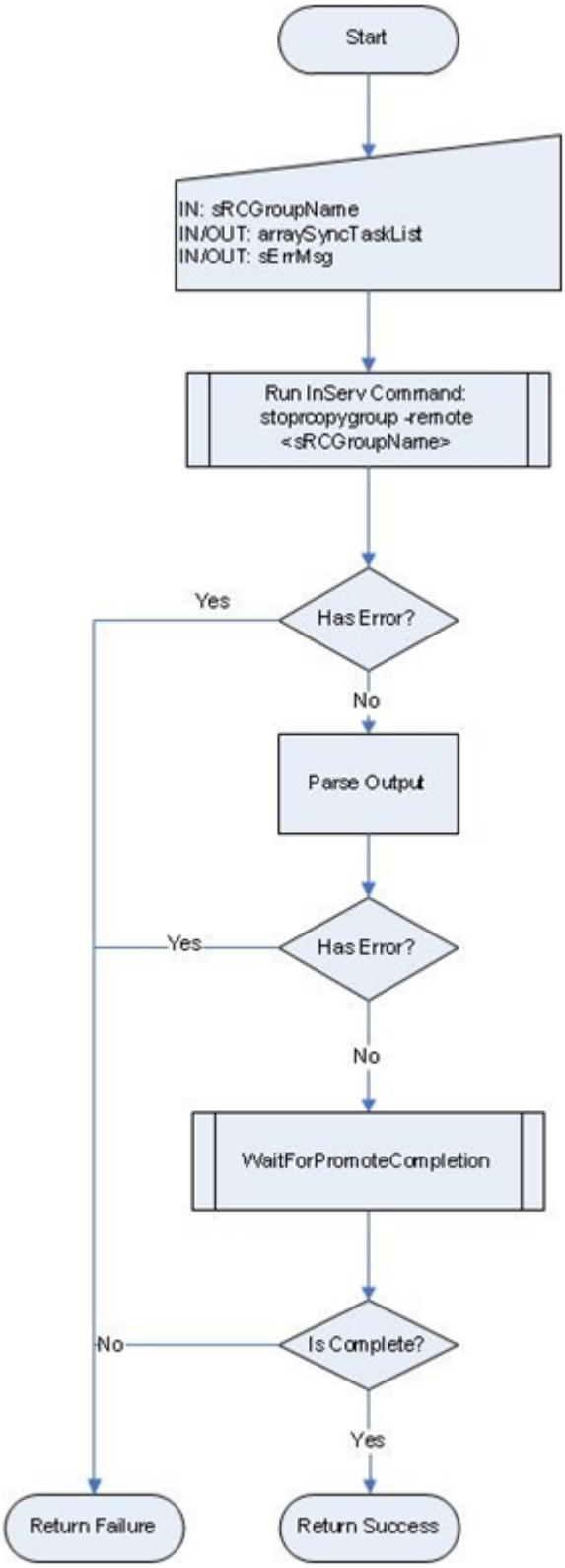
StartRemoteCopyGroup



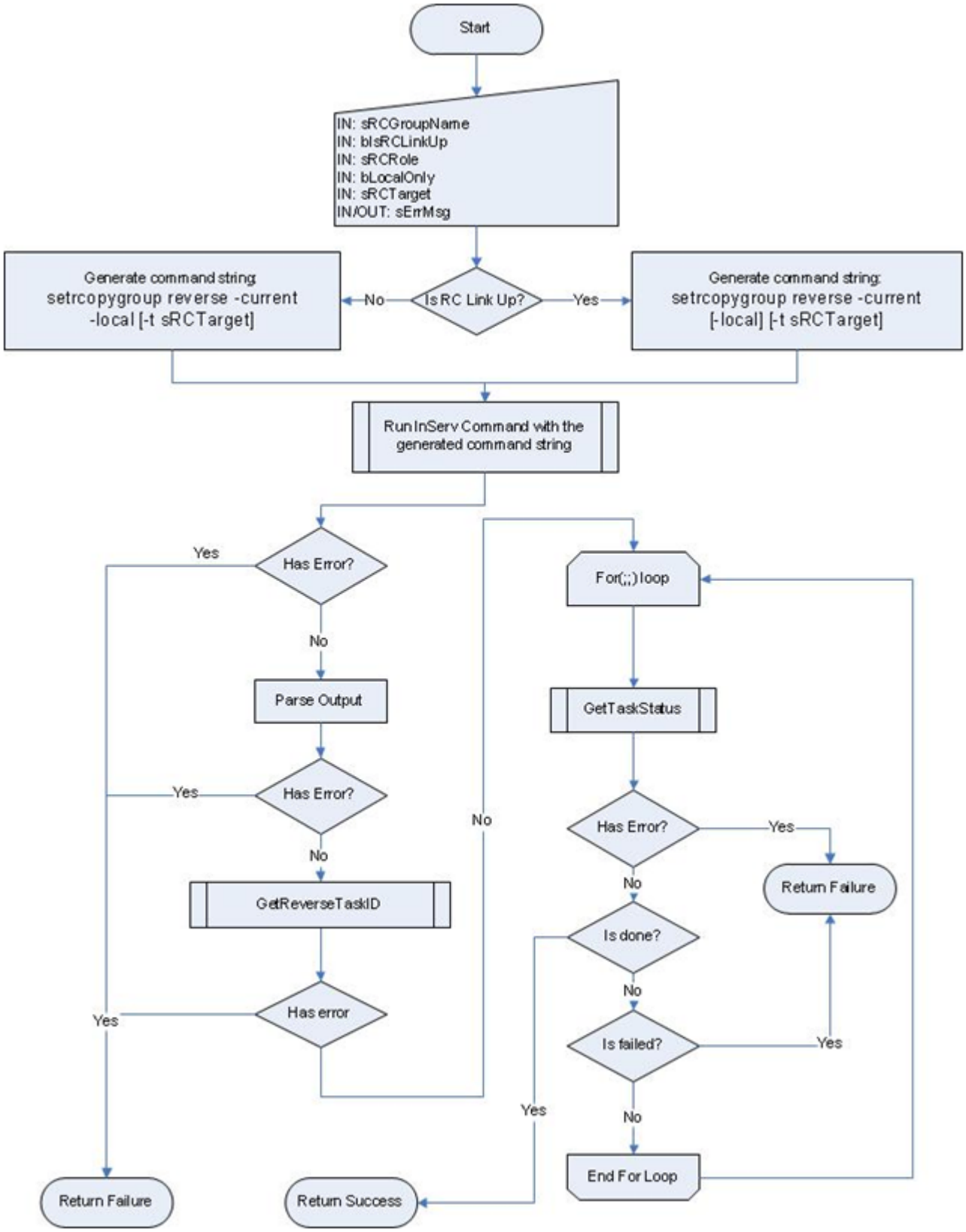
StopRemoteCopyGroup



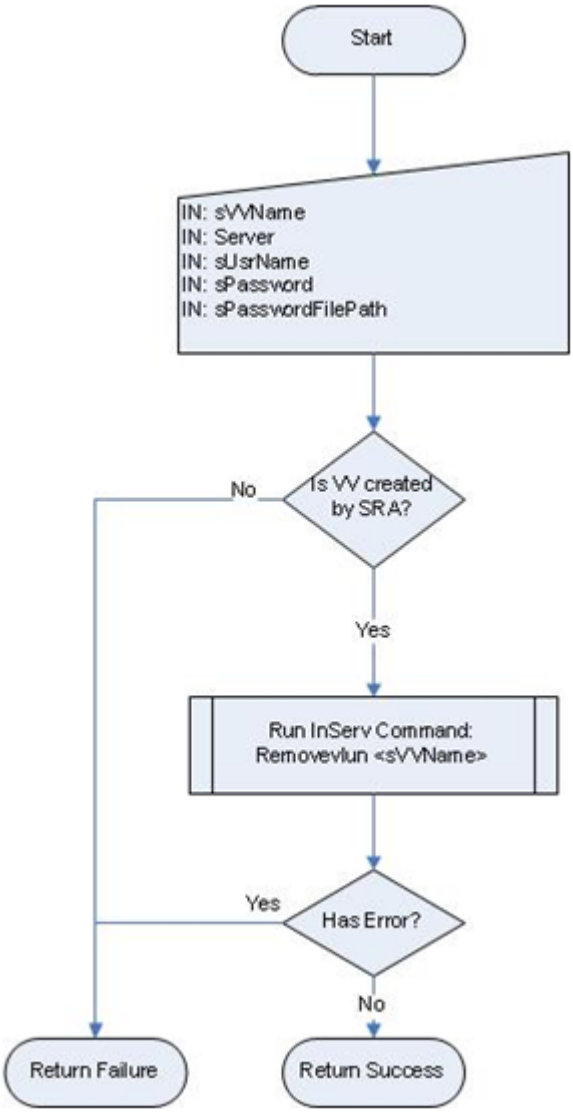
SyncRemoteCopy



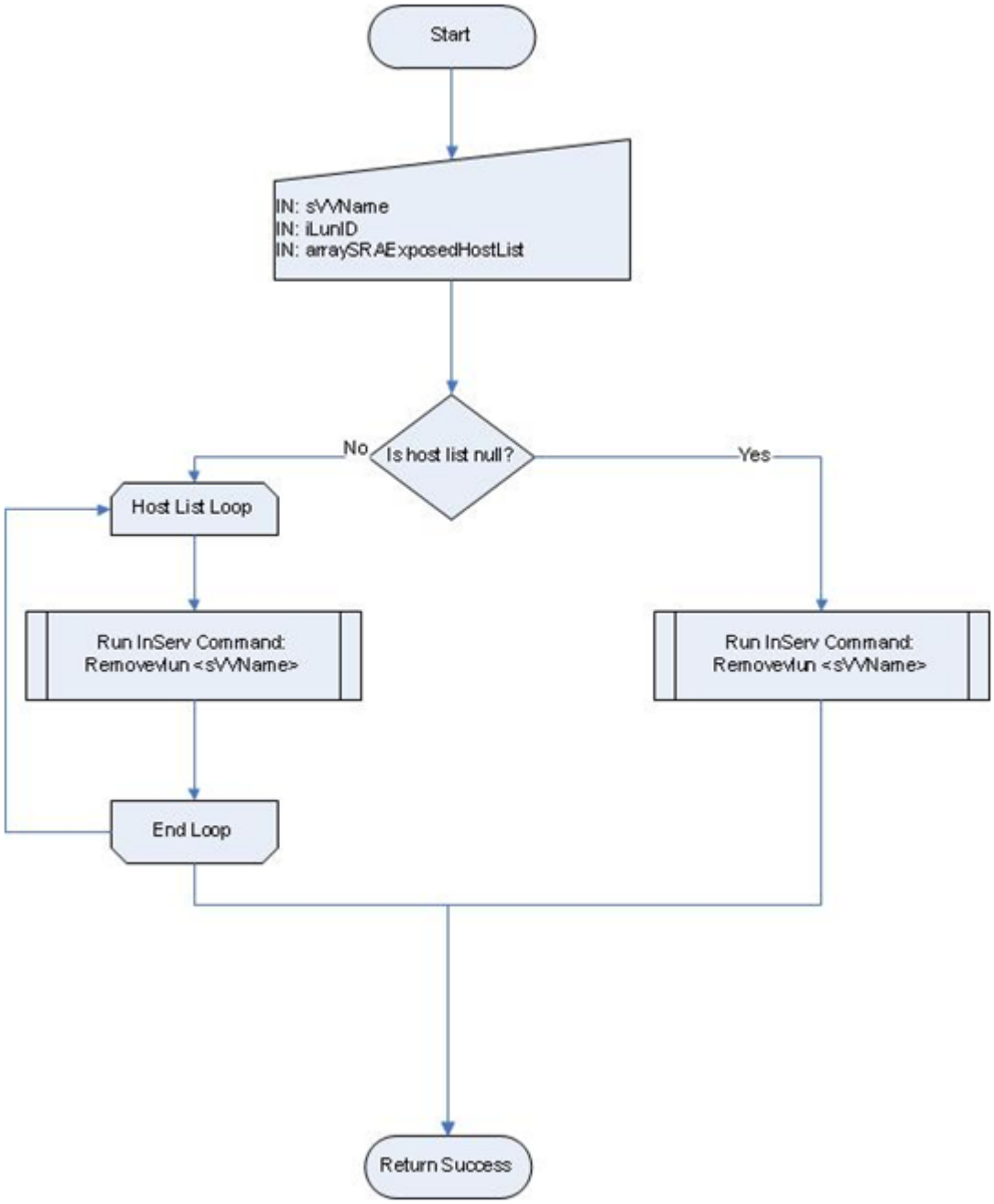
UndoRemoteCopyGroupRole



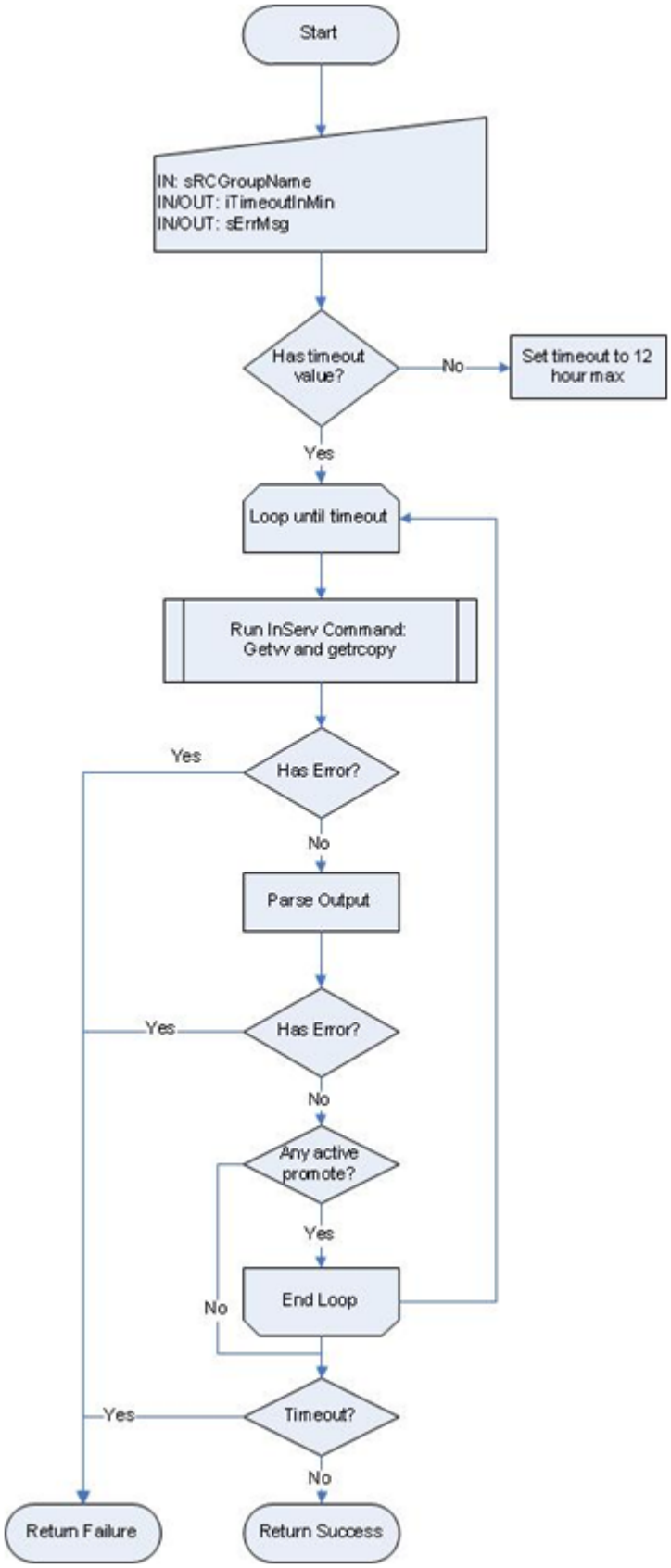
UnExposeVVFromAllHost



UnExposeVVFromHost



WaitingForPromoteCompletion



4 Error Messages

Table 21 Message Table

Name	Message Description	Fix Hint
3PAR_1001	Error. Exception has occurred: <ExceptionString>	Contact HP 3PAR support if the problem persists.
3PAR_1002	Error. Failed to create process due to the following: <ConnProblem>	If you have firewall or anti-virus sorftware installed on your system, make sure it allows network access for the HP 3PAR Storage System.
3PAR_1003	Error. Missing user name information.	User information is required for HP 3PAR Storage System authentication.
3PAR_1004	Error. Missing password information.	Password information is required for HP 3PAR Storage System authentication.
3PAR_1005	Error. Missing address information.	The HP 3PAR Storage System host name or IP address is required for communication.

Table 21 Message Table *(continued)*

Name	Message Description	Fix Hint
3PAR_1006	Error. The InServ Storage Server <ServerAddress> is not accessible.	• Make sure you entered correct address for the HP 3PAR Storage System. • Check if there is any problem with your network connection.
3PAR_1007	Error. Unable to get system information. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1008	Error. Unable to get InServ license information. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1009	Error. Unable to get Remote Copy target system list. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1010	Error. Unable to identify required header column. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1011	Error. Unable to get Remote Copy group information. Additional information: <ExceptionString>.	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1012	Error. Array ID <ArrayID> does not match the connected 3PAR Storage Server.	Make sure you are connecting to the correct HP 3PAR Storage System. If the problem persists, reconfigure your protected and recovery group setup.
3PAR_1013	Error. Peer Array ID <ArrayID> is not a valid entry in the connected 3PAR Storage Server.	Make sure you are connecting to the correct HP 3PAR Storage System. If the problem persists, reconfigure your protected and recovery group setup.

Table 21 Message Table *(continued)*

Name	Message Description	Fix Hint
3PAR_1014	Error. Missing required <LicenseName> license on the connected 3PAR Storage Server.	If you are missing the required license to perform replication or snapshot operation, access your HP 3PAR Storage System and issue the `showlicense` command to get license information. If you do not see the required license, contact HP 3PAR support for assistance.
3PAR_1015	Error. Unable to get Remote Copy group information. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1016	Error. Unable to get the status of a Remote Copy Group. The original output: <OrgOutput>	Verify there is no problem with your network connection at this time.
3PAR_1017	Error. Unable to get Remote Copy target system information. Additional information: <ExceptionString>.	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1018	Error. Unable to get detail virtual volume information. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1019	Error. Unable to get detail virtual volume exposure information. Additional information: <ExceptionString>.	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1020	Error. Exception in array search. Additional information: <ExceptionString>	There is a problem with the internal caching mechanism. Re-try the operation. If the problem persists, contact HP 3PAR support for assistance.
3PAR_1021	Error. The secondary volumes are not in Synced state.	Synchronization is initiated by the disaster recovery command or manual command. Data on the secondary system cannot be used until the synchronization completes.
3PAR_1022	Error. The specified group <GroupName> does not exist in the storage array.	The Remote Copy group might already be removed. Check your HP 3PAR Storage System for confirmation and recreate the Remote Copy group to continue the operation.

Table 21 Message Table *(continued)*

Name	Message Description	Fix Hint
3PAR_1023	Error. Unable to show Remote Copy link information. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1024	Error. Unable to get detail InServ port information. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1025	Error. Unable to get task list by type from InServ. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1026	Error. No output is generated from InForm command <CLICommand>.	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1027	Error. Unable to get detail task information by ID. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1028	Error. Unable to get InServ version number information. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1029	Error. Unable to verify InServ version number.	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance.

Table 21 Message Table *(continued)*

Name	Message Description	Fix Hint
		• If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1030	Error. Unable to get date information from InServ. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1031	Error. Unable to get InServ port information. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1032	Error. Unable to get detail InServ host information. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1033	Error. Unable to stop Remote Copy group remotely. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1034	Error. Unable to stop Remote Copy group <GroupName> remotely.	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1035	Error. Remote Copy target configuration mirroring cannot be disabled. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed

Table 21 Message Table *(continued)*

Name	Message Description	Fix Hint
		on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1036	Error. Unable to stop Remote Copy Group <GroupName> locally.	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1037	Error. Remote Copy target configuration mirroring cannot be re-established. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1038	Error. Wait for promote completion has timed out on Remote Copy group <GroupName>	After a Remote Copy group is stopped, some devices might be running volume promotions. This operation has exceeded the internal defined 12 hours time out value. If this is not a normal behavior, contact Hp 3PAR support for more information.
3PAR_1039	Error. InServ failover command has failed. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1040	Error. Failed to get the task identification number associated with the failover operation.	Task ID information is missing after running failover operation. Connect to the target HP 3PAR Storage System and issue the `showtask` command to see if the failover operation is already been activated.

Table 21 Message Table *(continued)*

Name	Message Description	Fix Hint
3PAR_1041	Error. Failover task has failed. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1042	Error. Unable to restore the Remote Copy group remotely. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1043	Error. Failed to issue reverse command to Remote Copy group. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1044	Error. Unable to get detail information of virtual volume that participated in Remote Copy group. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1045	Error. Exception occurs during virtual volume array cache search. Additional information: <ExceptionString>	There is a problem with the internal caching mechanism. Re-try the operation. If the problem persists, contact HP 3PAR support for assistance.
3PAR_1046	Error. Unable to find virtual volume <VVName> in the virtual volume array cache.	Check your HP 3PAR Storage System to see if the specified volume still exists.

Table 21 Message Table *(continued)*

Name	Message Description	Fix Hint
3PAR_1047	Error. Unable to get virtual volume LUN information. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1048	Error. Failed to create virtual LUN. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1049	Error. Unable to remove virtual LUN. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1050	Error. Unable to remove RW snapshot from the base VV. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1051	Error. Unable to remove RO snapshot from the base VV. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1052	Error. <setrcopygroup restore> operation timed out on Remote Copy group <GroupName>.	The restore disaster recovery command for the Remote Copy Group has been running for more than 12 hours and reached the operation timeout value. This is an indication that the Remote Copy group restore operation has failed. Access your HP 3PAR Storage System for more information on the current state of the Remote Copy group. If this is not a normal behavior, contact HP 3PAR support for more information.
3PAR_1053	Error. Unable to find match ID <VVID> in the virtual volume array cache.	Check your HP 3PAR Storage System to see if the specified virtual volume ID still exists.

Table 21 Message Table *(continued)*

Name	Message Description	Fix Hint
3PAR_1054	Error. Unable to create group snapshot. Additional Information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1055	Error. This version of SRA does not support 3PAR Storage Server that has 2.2.x InFormOS.	This version of SRA does not support InForm OS version 2.2.x . Make sure your system is running InFormOS 2.3.x. or above. Issue the `showversion` command on your HP 3PAR Storage System to display the system's InForm OS version.
3PAR_1056	Error. Unable to sync Remote Copy group. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1057	Error. Invalid device found in a target group. Additional information: <GroupName_VVID>	Make sure that the SRM specified virtual volume ID is one of the members in the Remote Copy group. Access the HP 3PAR Storage System and issue the `showrcopy` command to get more information.
3PAR_1058	Error. <setrcopy restore> operation has failed on Remote Copy group <{GroupName}>.	The restore operation of the specified Remote Copy group has failed. Access the HP 3PAR Storage System to get more information.
3PAR_1059	Error. Unable to start the specified Remote Copy Group. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1060	Error. Remote Copy group <GroupName> is not started.	Remote Copy group is not started. Access your HP 3PAR Storage System for more detailed information.

Table 21 Message Table *(continued)*

Name	Message Description	Fix Hint
3PAR_1061	Error. Synchronization has failed. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1062	Error. Unable to stop the specified Remote Copy group. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1063	Error. All available Remote Copy links are down for <GroupName>.	Access your HP 3PAR Storage System and issue the `showrcopy links` command to see the current Remote Copy link status.
3PAR_1064	Error. Remote Copy group <GroupName> is not fully synchronized to the target server.	Test failover is not allowed when synchronization is in progress. Re-try when the synchronization completes.
3PAR_1065	Error. Unable to reverse the Remote Copy group role. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1066	Error. Unable to recover the replication. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1067	Error. Failed to get the task identification number associated with recover operation.	Access your HP 3PAR Storage System to verify if an active recover operation is in progress.

Table 21 Message Table *(continued)*

Name	Message Description	Fix Hint
3PAR_1068	Error. Remote Group <GroupName> is not a Primary Group in the 3PAR Storage Server.	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1069	Error. Unable to create InForm process.	If you have firewall or anti-virus software installed on the system, make sure that it allows network access to the HP 3PAR Storage System.
3PAR_1070	Error. Error occurred during connection to 3PAR Storage Server. Additional information: <ExceptionString>	Make sure you have network access to the HP 3PAR Storage System and the authentication information is entered correctly.
3PAR_1071	Error. Unable to get the next available LUN ID for initiator <HostName>	Check the number of LUNs currently exposed to the specified host on your HP 3PAR Storage System.
3PAR_1072	Error. Unable to perform test failover for group <GroupName> due to one or more invalid initiators specified in the Access Group list.	Re-scan your datastore to make sure it has the most up-to-date information.
3PAR_1073	Error. The <Item> list is empty.	This may be the result of a corrupted input XML file.
3PAR_1074	Error. Unable to issue showeventlog command. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1075	Error. Unable to issue promotesv command. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1076	Error. Data on target site might be corrupted for Remote Copy group <GroupName>. Unable to continue the restore operation.	The Remote Copy group is not consistent to its original state. Refer to the SRA implementation guide for more detailed information.
3PAR_1077	Error. Remote Copy group <GroupName> is not in the correct mode for this operation.	The Remote Copy group is not in the correct role to perform the corresponding operation. Contact your storage administrator for assistance.
3PAR_1078	Error. 3PAR SRA does not support individual device configuration. Device id: <DeviceID>.	HP 3PAR SRA only supports Group Replication.
3PAR_1079	Error. Unable to get product uuid from Windows installation database.	There might be a problem with your installation. Re-install the package.
3PAR_1080	Error. Unable to identify the recovery point <RecoveryPointId> information.	Make sure that the specified recovery point is still available in the storage array.

Table 21 Message Table *(continued)*

Name	Message Description	Fix Hint
3PAR_1081	Error. Unable to get volume history information for device. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1082	Error. Unable to promote device to the specified recovery point. Additional information: <ExceptionString>	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_1083	Error. Unable to get task id after promote operation for device name <{VVName}>	Task information is missing after initiating the promotesv command. Contact support for troubleshooting.
3PAR_1084	Error. One or more target devices are exposed to hosts.	Failover to a recovery point requires all LUNs be removed for the target devices. New LUNs are created automatically to the specified initiator during the failover process.
3PAR_1085	Error. 3PAR SRA registry <RegPath> is inaccessible.	This might be a result of corrupted registry key or not having permission to access the registry key.
3PAR_1086	Error. Failed to get the task identification number associated with reverse operation.	You can access your HP 3PAR Storage System to verify if an active reverser operation is in progress.
3PAR_1087	Error. Unable to load default resource dll.	Re-install the SRA package to restore the missing resource `dll`.
3PAR_1088	Error. Promote to the specific recovery point has failed.	Review the HP 3PAR Storage System event log for more detailed information.
3PAR_1089	Error. Operation timeout while waiting for promote to complete on <RCGroup>	Check the virtual volume status of the Remote Copy group and HP 3PAR Storage System event log for volume promote information before retry again.
3PAR_1090	Error. Unable to perform failover for group <GroupName>due to one or more invalid initiators specified in the Access Group list.	Make sure the initiator list specified is valid.
3PAR_1091	Error. Invalid sync ID <SyncId> is specified.	The specified sync ID is not valid on the specific group. Re-try the sync operation.
3PAR_1092	Error. Remote Copy group <GroupName> is already in test failover process.	Wait until the existing test completes before running other test on the same group.
3PAR_1093	Error. VV ID <VVID> has been exposed using different LUN ID.	Remove existing exposure of this VV manually to resolve the problem.
3PAR_1094	Error. LUN ID <VlunNo> is not available across all hosts within the same group.	Remove all existing exposure for the specific device to resolve this problem.
3PAR_2001	Warning. Unable to get product uuid from Windows installation database.	Make sure that you have sufficient privilege to query installation information.

Table 21 Message Table *(continued)*

Name	Message Description	Fix Hint
3PAR_2002	Warning. No associated VLUN information is found for LUN ID <LunID>.	This volume is currently not exposed to any host.
3PAR_2003	Warning. Remote Copy Group <GroupName> might not be in sync.	This is the result of Remote Copy group not being in started status and some of its VV members are not in synced state.
3PAR_2004	Warning. Unable to stop Remote Copy roup <{GroupName}>. Retry after 30 seconds.	This operation will be tried again after the specified time interval.
3PAR_2005	Warning. Local system does not support WaitOne function. Alternative API is used to wait for 30 seconds.	The local host does not have at least .NetFramework 2.0 SP2 installed to support this API.
3PAR_2006	Warning. Identification <WWN> is not assigned.	This might be the result of VV being exposed to a host set.
3PAR_2007	Warning. Unable to update status file. Additional information: <ExceptionString>	Make sure the status file is not locked by other applications.
3PAR_2008	Warning. Unable to identify <WW}> to be a registered host in 3PAR Storage Server.	Make sure all ESX servers involved in the protect group are connected to the same HP 3PAR Storage System.
3PAR_2009	Warning. Snapshot <SnapName> is not exposed to any host.	The snapshot might have been removed from the HP 3PAR Storage System.
3PAR_2010		• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_2011	Warning. Unable to get DR state information for Remote Copy Group <GroupName>.	• If the error is caused by insufficient privilege to issue the command, contact your storage administrator for assistance. • If the error is related to network issues, check if you have problem with your network connection. • If you have firewall or anti-virus software installed on the system, make sure it allows network access to the HP 3PAR Storage System.
3PAR_2012	Warning. Remote Copy link for replication target <TargetName> is down. Data is not in sync.	This might be a result of the previous failover operation from SRM or a manual failover operation on the HP 3PAR Storage System.
3PAR_2013	Warning. Unable to start the replication process. Additional information: <ExceptionString>	SRA is unable to start the replication process after the disruptive test failover operation. Access your HP 3PAR Storage System for more detailed information on the current status of the Remote Copy group.
3PAR_2014	Warning. Unable to access the specified log folder. The log file will be available at the following location: <LogPath>.	Make sure the SRM specified log folder is accessible.
3PAR_2015	Warning. Connection has the following problem: <ConnProblem>. Retry again.	SRA will re-try the connection again.

Table 21 Message Table *(continued)*

Name	Message Description	Fix Hint
3PAR_2016	Warning. 3PAR SRA only supports group replication.	HP 3PAR Remote Copy Software only supports group replication.
3PAR_2017	Warning. Group name <GroupName> has unsupported naming convention.	SRA does not support group name that contains <xxx>.r<xxx>.
3PAR_2018	Warning. Recovery point information is not available.	Snapshot is not created according to the specification to support recovery point.
3PAR_2019	Warning. Remote Copy group <GroupName> is in invalid SRA state.	The Remote Copy group can be in an invalid SRA state after re-installing or re-configuring the SRM setting after failover. Refer to the SRA Implementation Guide for how to reset the SRA state to this group.
3PAR_2020	Warning. Configuration with more than one Remote Copy group per protected group is not a recommended setup.	This is the result of having one protected group spanning across multiple Remote Copy groups. This is not a recommended setup. To resolve this issue, make sure all the volumes used in one protected group comes from the same Remote Copy group.
3PAR_3001	Info. Remote Copy Group {0} is currently having {1} role under {2} state.	None.
3PAR_3002	Info. Remote Copy Group <GroupName> has been stopped remotely.	None.
3PAR_3003	Info. Remote Copy target <TargetName> mirroring configuration has been disabled.	None.
3PAR_3004	Info. Remote Copy target <TargetName> mirroring configuration has been re-established.	None.
3PAR_3005	Info. Volume promotion has completed after the Remote Copy group <GroupName> is stopped.	None.
3PAR_3006	Info. Failover is in progress for Remote Copy group <GroupName>. Check again in 5 seconds.	None.
3PAR_3007	Info. Failover has completed with Remote Copy group <GroupName>.	None.
3PAR_3008	Info. Restore process has been initiated for Remote Copy group <GroupName>.	None.
3PAR_3009	Info. Remote Copy group <GroupName> has been restored successfully.	None.
3PAR_3010	Info. Restoring Remote Copy group <GroupName> is in progress. Check again in 60 seconds.	None.
3PAR_3011	Info. The replication direction on Remote Copy group <GroupName> has been successfully reversed.	None.
3PAR_3012	Info. Remote Copy group <GroupName> already has Primary role.	None.
3PAR_3013	Info. Remote Copy group <GroupName> has an on-going promote operation. Check again in 60 seconds.	None.

Table 21 Message Table *(continued)*

Name	Message Description	Fix Hint
3PAR_3014	Info. No associated VLUN information is found for LUN ID <LunID>.	None.
3PAR_3015	Info. VV is already exposed to the specified host. Additional information: <ExposeInfo>	None.
3PAR_3016	Info. Virtual volume <VVName> is already exposed to the specified initiator group.	None.
3PAR_3017	Info. LUN ID <LunID> will be used.	None.
3PAR_3018	Info. Snapshot LUN <VVName> is already exposed.	None.
3PAR_3019	Info. Snapshot <VVName> has been removed successfully.	None.
3PAR_3020	Info. No VLUNs listed in this 3PAR Storage Server.	None.
3PAR_3021	Info. Remote Copy group <GroupName> is started successfully.	None.
3PAR_3022	Info. Remote Copy group <GroupName> has initiated the data synchronization.	None.
3PAR_3023	Info. Remote Copy group <GroupName> has been stopped successfully.	None.
3PAR_3024	Info. Remote Copy group <GroupName> has been reversed successfully.	None.
3PAR_3025	Info. Remote Copy group <GroupName> has been recovered successfully.	None.
3PAR_3026	Info. Recover has completed with Remote Copy group <GroupName>.	None.
3PAR_3027	Info. Status checking for Remote Copy link target <LinkStatus>.	None.
3PAR_3028	Info. Start waiting for promote completion.	None.
3PAR_3029	InForm CLI command to call: <Command>	None.
3PAR_3030		None.
3PAR_3031	Info. Call exit.	None.
3PAR_3032	<InfoMsg>	None.
3PAR_3033	========== START OF <sraCommand}>==========	None.
3PAR_3034	########## END OF <sraCommand> ##########	None.
3PAR_3035	Info. SRM requested log folder location: <LogFolder>	None.
3PAR_3036	Info. SRM requested log level: <LogLevel>	None.

Table 21 Message Table *(continued)*

Name	Message Description	Fix Hint
3PAR_3037	Info. Mutex wait has failed. Additional information: <ExceptionString>	None.
3PAR_3038	Info. <InfoMsg>	None.
3PAR_3039	Info. Wait for all promote operations to complete.	None.
3PAR_3040	Info. Check if there is any failed promote operation.	None.
3PAR_3041	Info. Group promote has failed. Prepare to recover all devices back to its original content.	None.
3PAR_3042	Info. User updates the log file size to be: <LogSize> MB	None.
3PAR_3042	Info. User updates the maximum number of log file to: <LogNum>	None.
3PAR_3044	Info. Current loaded log size setting is: <LogSize. MB	None.
3PAR_3045	Info. Current loaded maximum number of log file is: <LogNum>	None.
3PAR_3046	Info. Wait on mutex object for log is not available. Additional information: <ExceptionString>	None.
3PAR_3047	Info. Start to cleanup any backup snapshot created from previous prepareFailover operation.	None.
3PAR_3048	Info. Undo group changes is in progress for Remote Copy group <GroupName>. Check again in 5 seconds.	None.
3PAR_3049	Info. Reverse replication is in progress for Remote Copy group <GroupName>. Check again in 5 seconds.	None.